Curriculum Committee Meeting Agenda

Voting Committee Members
Chair – Mimi Pentz (Nurs/Hlth Occ)
Vice Chair – Andrea LoMonaco (Business)

Kristen Booth (Pre-Coll/ESOL)
Jenn Kamrar (Art/Comm)
Emilie Miller (Science)
Pam Morse (Math)
Stephen Shwiff (Soc Sci & Ed)
Tori Stanek (Inst Dean/Dir)
Robert Wells-Clark (Tec/Trad)

Non-Voting Committee Members
Jarett Gilbert (VP Instructional Services)
Susan Lewis (Curriculum)
Mary Martin (Student Services/Registrar)

Support Staff
Sara Wade (Instructional Services)

Guests
Janie Griffin, Todd Aldrich

May 9, 2024 3:30 – 5:00 pm
The Dalles Campus, room 1.162 (Board Room, Building 1 next to cafe)
Hood River Center, room 1.209 (conference room)
Zoom log-in: https://cgcc.zoom.us/j/84308320742; Meeting ID: 843 0832 0742; phone in: 1-253-215-8782

Information item: Introduction to Credit for Prior Learning via licensure articulation [1] (Susan)

Submissions [2]

1. Janie Griffin (3:45 – 3:55pm)
    - Emergency Medical Technician – Licensure Articulation
2. Tyson Aldrich (3:55 – 4:15pm)
    - Aviation General Written Exam – Licensure Articulation
    - Aviation Airframe Rating – Licensure Articulation
    - Aviation Powerplant Rating – Licensure Articulation
3. Robert Wells-Clark (4:15 – 4:55pm)
    - Solidworks Mechanical Design Digital Badge – Licensure Articulation
    - Autodesk Professional Design for Manufacturing – Licensure Articulation
    - Autodesk Professional Design for Manufacturing – Licensure Articulation
    - Solidworks Mechanical Design Academic Version – Licensure Articulation
    - Autodesk Professional Design for Manufacturing – Licensure Articulation
    - Autodesk Professional Design for Manufacturing – Licensure Articulation
    - AWS D1.1 4G, SMAW or GMAW Mild Steel, Expired Ok – Licensure Articulation
    - AWS D1.1 3G GMAW or SMAW Mild Steel, Expired Ok – Licensure Articulation
    - D1.2G SMAW, GMAW Mild Steel, Expired ok – Licensure Articulation
    - CAM for 2.5 Axis Milling – Licensure Articulation
    - Haas Basic Mill – Licensure Articulation
    - Mastercam 2D Mill – Licensure Articulation
    - Autodesk Certified Professional in CAM for 3 Axis Milling – Licensure Articulation
    - Mastercam 3D Mill – Licensure Articulation
    - AWS D1.2 2G GTAW Aluminum, Expired OK – Licensure Articulation
    - D1.6 GTAW 2G Stainless Steel, Expired Ok – Licensure Articulation

New Business

1. none

Next Meeting: May 14, 2024 – Curriculum Committee Retreat
Attachments: [1] AR – CPL Licensure Approval, OP – CPL Licensure Approval; [2] Submissions: 20 Licensure Articulations

ADMINISTRATIVE RULE

Approved Date: MM/DD/YY
Effective Date: MM/DD/YY
Last Revised: MM/DD/YY

Rule Number/Name:	040.???.??? – Credit for Prior Learning – Acceptance of Licensure/Certification for Credit Approval
Responsible Department:	Instructional Services
Authority:	Director of Curriculum & Academic Assessment

Overview

Oversight for accepting specific licensures/certifications as Credit for Prior Leaning (CPL) for identified CGCC courses exists with the college's Curriculum Committee. Submissions requesting recognition/approval of licensure/certification CPL are normally initiated at the department level, by faculty. They may also originate out of a need identified by the administration and/or community partners, both public and private.

Applicability

Faculty, Academic Departments, Curriculum Office, Curriculum Committee, and Instructional Services Staff and Administration

Administrative Rule Statement

Columbia Gorge Community College recognizes official licensures/certifications that have been brought before and preapproved by the college's Curriculum Committee as fulfilling specified course credits within the college's course offerings.

Guiding principles for approval, include:

- Licensure/certification must be granted by an official agency/institution
- Licensure/certification requirements must align with a minimum of 80% of the course's student learning outcomes
- Partial course credit may not be awarded through CPL earned by licensure/certification
- Multiple licensures/certifications may be combined to fulfill the outcomes of a single course, allowing CPL to be awarded if all licensures/certifications are evidenced by the submitting student

Submission and approval will follow the prescribed procedures as described in Operating Procedure 040.???.001 Credit for Prior Learning – Acceptance of Licensure/Certification for Credit Approval.

Definitions

A. *Credit for Prior Learning*: Credit for Prior Learning is a program that allows students to demonstrate their mastery of subject matter through various means such as exams, portfolios, and other assessments. This means that students can earn college credit for prior learning experiences, including (but not limited to) work experience, military training, volunteer work, and independent study.

B. *Curriculum*: All courses offered and their content; a prescribed set of courses leading to a specific outcome, which may include the completion of a degree, certificate, or program.

Interpretation of Administrative Rule

Director of Curriculum & Academic Assessment

Cross Reference to Related Administrative Rules

1. none

Further Information

Director of Curriculum & Academic Assessment
slewis@cgcc.edu
541-506-6047

Strategic Direction

Strategic Priority: Student Success

Appendix

1. CGCC Curriculum Committee Charter
2. OP 040.???.001 Credit for Prior Learning – Acceptance of Licensure/Certification for Credit Approval

OPERATING PROCEDURE

Approval Date: MM/DD/YY
Effective Date: MM/DD/YY
Last Revised: MM/DD/YY

Procedure Number/Name:	040.???.??? – Credit for Prior Learning – Acceptance of Licensure/Certification for Credit Approval
Associated Rule Number/ Name:	040.???.??? – Credit for Prior Learning – Acceptance of Licensure/Certification for Credit Approval
Responsible Department:	Instructional Services

Overview

Credit for Prior Leaning (CPL) Recognition of Licensure/Certification requests are submitted, in accordance with established procedures and deadlines, to the Curriculum Office for placement on the next available Curriculum Committee agenda. Committee decisions are forwarded to the vice president of Instructional Services (VPIS) for approval.

Areas of Responsibility

The individual(s) proposing the CPL Acceptance of Licensure/Certification, the Curriculum Committee, and the VPIS are responsible for following the established procedures. The Curriculum Office provides technical, content, and routing assistance.

Operating Procedure Details

The Curriculum Committee process for considering a proposal will be as follows:

A. CPL Acceptance of Licensure/Certification Requests are submitted to the Curriculum Office using approved submission forms available on the Curriculum Office resources webpage under Curriculum Forms.
B. The Curriculum Office will place submissions on the next available Curriculum Committee agenda and post to the Curriculum Office website prior to each Curriculum Committee meeting.
C. Representative(s) for each request are required to attend the committee meeting in order to represent their department and respond to Committee questions. Unrepresented submissions will be postponed to a later meeting.
D. The Committee will vote to approve or not approve each request/submission. Approval requires a positive vote of 50% + one with a quorum present.
    a. Approved submissions will be routed to the VPIS.
    b. Submissions not approved may be:
        i. Postponed for further development, resubmission, and review;
        ii. Withdrawn; or
        iii. Directed to the VPIS for arbitration. The VPIS will not override a committee decision. Concerns/differences will be discussed by the VPIS and the committee in order to find a common understanding and decision. If no resolution can be made, an ad hoc committee will be appointed by the Curriculum Committee chair and the VPIS to address and resolve the issue.

Post Curriculum Committee Approval Process

A. Acceptance of CPL for Licensure/Certification requires endorsement by the VPIS.
    a. VPIS questions that cannot be satisfactorily answered by the Curriculum Office or the submitting department will be brought to the Curriculum Committee for further clarification and discussion.
    b. The VPIS will not override a committee decision. Concerns/differences will be discussed by the VPIS and the committee in order to find a common understanding and decision. If no resolution can be made, an ad hoc committee will be appointed by the Curriculum Committee chair and the VPIS to address and resolve the issue.
B. Following Curriculum Committee approval, the Curriculum Office will notify the following individuals of said approval: registrar, submitting department chair, submitting department dean or director, director of advising, vice president of Instructional Services, and vice president of Student Services.
C. Approved CPL for Licensure/Certification will be posted to the appropriate webpages and noted in the catalog.

Definitions

A. *Credit for Prior Learning*: Credit for Prior Learning is a program that allows students to demonstrate their mastery of subject matter through various means such as exams, portfolios, and other assessments. This means that students can earn college credit for prior learning experiences, including (but not limited to) work experience, military training, volunteer work, and independent study.
B. *Curriculum*: All courses offered and their content; a prescribed set of courses leading to a specific outcome, which may include the completion of a degree, certificate, or program.
C. *Quorum*: 50% + one of active voting committee members represent a quorum.
D. *Active committee member*: Faculty elected to serve by their department, not on leave or temporarily excused because of conflicting class schedule; professional management representatives (instructional director/dean) not on leave or temporarily excused because of conflicting assignment.

Further Information

Director of Curriculum & Academic Assessment
slewis@cgcc.edu
541-506-6047

References

1. CGCC Curriculum Committee Charter

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	Nursing and Health Occupations	Submitter name: phone: email:	Janie Griffin 541-506-6140
License/Certification Title:	Emergency Medical Technician	Granting Institution(s)/Agency(s):	Oregon Health Authority or any state Licensing Board who oversees professional licenses for EMTs.
Course Equivalency:	Course Title(s):	EMS105 and EMS106	
	Credits:	EMS105 -6 credits & EMS106 – 6 credits	
Potential application to current awards:	• Emergency Medical Technician certificate (28 credits) • Paramedic AAS (108 credits)		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	Emergency Medical Technician (licensure level definition) "The Emergency Medical Technician is a health care professional whose primary focus is to respond to, assess and triage emergent, urgent, and non-urgent request for medical care, and to apply basic knowledge and skills necessary provide patient care and medical transportation to/from an emergency or health care facility. EMTs are sometimes the highest level of care a patient will receive in an ambulance transport. EMTs may serve as a patient care team member in a hospital, or health care setting to the full extent of their education, certification licensure and credentialing. They are often the first to arrive at the scene and are expected to quickly assess, patient conditions, provide stabilizing measure and request additional resources as needed." (National Emergency Medical Services Education Standards: National Scope of Practice) To be licensed as an Emergency Medical Technician (EMT) in any state, a person must complete the following steps: • Complete an Approved Education Program: Enroll in and successfully complete an EMT course that meets or exceeds the National EMS Education Standards. These courses cover essential skills needed for emergency medical services. • Clinical and Field Experience: Gain hands-on experience through documented clinical hours in a hospital emergency room and field experience through precepted ambulance ride-along, which are critical for real-world training. • Pass the National Registry Emergency Medical Technicians (NREMT) Exam: After completing the educational and practical training requirements, the individual must pass the NREMT exam, which is a standardized test ensuring

all EMTs have the knowledge and skills necessary for effective emergency medical response. Awarded a certificate of completion from the NREMT after passing the exam.

- State Certification: Apply for licensure in the state where the EMT wishes to practice.
- Maintain Certification: Keep certification current by completing continuing education and adhering to any additional re-certification requirements set forth by the certifying state and the NREMT.

Following these steps ensures that an individual is properly trained, certified, and ready to provide critical medical services in emergencies.

EMS 105 EMT Part I

Description: Introduces the role of the Emergency Medical Technician (EMT) at the novice level. Develops the necessary understanding of human anatomy and physiology, as well as knowledge of relevant medical terminology. Provides training in the identification and use of EMT equipment, the assessment of patient status and development of a patient plan, the use of appropriate interventions, and professional and interpersonal communication in the prehospital setting. Explores the use of evidence-based practices in the EMT field and provides an introduction to the legal and ethical issues that may be encountered by the novice EMT. This is Part 1 of the 2-part Oregon EMT series. Course sequence requires mandatory orientation and passing a criminal background check and drug screen. Prerequisites: IRW 115 or WR 115 or equivalent placement; placement into MTH 65; current HCP CPR card. Audit available.

Outcomes with evidence of licensure coverage:

Outcome #1: Apply knowledge of basic anatomy and physiology of the human body and medical terminology as it relates to patient assessment in pre-hospital emergency situations.

- Emergency Medical Technicians (EMTs) gain their expertise, skills, and capabilities through structured education and training.
- The curriculum for EMT training programs must adhere to the National EMS Educational Standards.
- Licensed EMTs are expected to quickly recall and apply their knowledge of human anatomy and physiology when providing emergency care. Successful completion of the NREMT exams, both written and practical, demonstrates this competency.
- EMTs holding a license must be proficient in using correct medical terminology and phrases when recording assessment findings and care plans.

Outcome #2: Identify and use equipment needed to assess and care for the sick or injured patient at the novice EMT level.

- An Emergency Medical Technician acquires their knowledge, skills, and abilities through structured education and training, mastering all competencies expected of an EMT.
- A licensed EMT must exhibit proficiency in psychomotor skills, including the

assessment of patients and the use of emergency equipment.

- Practicing EMTs are required to quickly recall and efficiently use their knowledge and skills to operate life-saving emergency equipment.
- The scope of practice for EMTs is confined to basic procedures that are safe and effective to perform outside of hospital settings, under medical supervision, and within their scope of practice.

Outcome #3: Assess patient status and analyze information to formulate a patient treatment plan at the novice EMT level.

- The scope of practice for Emergency Medical Technicians includes performing basic, non-invasive procedures aimed at decreasing the complications and fatalities related to medical and trauma emergencies that occur outside of the hospital.
- Emergency medical care is predicated on a prompt response and rapid assessment using basic medical assessment tools:

  Cardiac monitors

  Pulse oximeters.

  Manual and automatic blood pressure cuffs

  Manual pulse checks

  Blood glucose monitoring devices

Outcome #4: Perform appropriate interventions at a novice EMT level.

- EMTs are required to quickly assess a patient's condition and the surrounding medical scenario, applying life-saving measures at the level taught in basic EMT training.
- EMTs must possess essential psychomotor skills and understand when and how to utilize the following techniques and equipment in emergencies:

  Airway and Breathing Management:

  - Maintaining appropriate body positions
  - Utilizing protective reverse oral airways
  - Performing Cardiopulmonary Resuscitation (CPR)
  - Administering oxygen using portable tanks and compressors with an O2 mask with ampule bag
  - Inserting oropharyngeal and nasopharyngeal airway adjuncts
  - Operating positive pressure ventilation devices, including manually triggered ventilators and automatic transport ventilators.

  Cardiac Care:

  - Performing CPR
  - Using cardiac defibrillators
  - Monitoring cardiac activity with an EKG

  Trauma Care:

- Applying and inflating pneumatic anti-shock garments
- Utilizing neck braces
- Employing pressure devices for fracture stabilization

Pharmacological Interventions:

- Assisting patients with their prescribed medications
- Administering over-the-counter medications under medical supervision:
- Oral glucose for suspected hypoglycemia
- Aspirin for suspected ischemic chest pain
- Administering epinephrine as indicated

Outcome #5: Have a basic understanding of EMS communications systems and interpersonal communication as they relate to the prehospital setting.

- Emergency Medical Technicians work alongside other EMS and health care professionals as an integral part of the emergency care team.
- Emergency Medical Technicians provide care to minimize secondary injury and provide comfort to the patient and family while transporting the patient to an emergency care facility.
- Emergency Medical Technicians communicate through electric devices and standardized documentation methods, telemetric monitoring devices and transmission of clinical data, including video data.

Outcome #6: Have an understanding of the legal requirements and obligations of an EMT.

- In many communities Emergency Medical Technicians provide a large portion of the out-of-hospital care. In some jurisdictions, especially rural areas, Emergency Medical Technicians provide the highest level of out-of-hospital care.
- The Emergency Medical Technician level is the minimum licensure level for personnel transporting patients in ambulances. The scope of practice is limited to basic skills that are effective and can be performed safely in an out-of-hospital setting with medical oversight and limited training.
- The Emergency Medical Technician is not prepared to make decisions independently regarding the appropriate disposition of patients.
- Emergency Medical Technicians adhere to HIPAA and patient confidentiality regulations.

EMS106 Part II

Description: Continues EMS 105. Develops the basic knowledge and skills necessary to treat victims of trauma, patients that present with special challenges, and sick and injured pediatrics. Expands knowledge and understanding of specific incidents that the Emergency Medical Technician may encounter in the field such as mass-casualty incidents, hazardous materials, motor vehicle collisions, and acts of terrorism.

Includes preparation for state and national licensing exams. Requires meeting Oregon Health Authority Standards for health profession student clinical training, including immunizations, TB screening and the ability to pass a criminal background check and drug screen before placement into mandatory clinical observations in hospital emergency department and ambulance ride-along experience. Prerequisites: completion of EMS 105 with a "C" or better at CGCC within the previous 5 terms; current HCP CPR card.

Outcomes with evidence of licensure coverage:

Outcome #1: Identify and use tools needed to care for the sick and injured patient at an EMT level.

Emergency Medical Technicians (EMTs) need a variety of tools and equipment to effectively care for sick and injured patients. Here is a list of essential tools typically used at the EMT level:

- Stethoscope: Used to listen to heart sounds, lung sounds, and blood flow in arteries and veins.
- Sphygmomanometer (Blood Pressure Cuff): Helps measure a patient's blood pressure.
- Oxygen Delivery Systems: Includes nasal cannulas, non-rebreather masks, and bag valve masks to administer supplemental oxygen.
- Automated External Defibrillator (AED): Provides electrical therapy to help establish an effective heart rhythm in cardiac arrest cases.
- Glucometer: Used to determine the approximate concentration of glucose in the blood; vital for diabetic patients or those exhibiting symptoms of altered blood sugar levels.
- Bandages and Dressings: Various sizes and types of bandages and dressings are used to control bleeding and protect wounds.
- Splints: For immobilizing and protecting injured limbs to prevent further injury.
- Traction Splints: Specifically used to stabilize and stretch out a fractured limb (commonly a femur).
- Spinal Immobilization Equipment: Includes cervical collars and spine boards to immobilize patients suspected of having spinal injuries.
- Trauma Shears: Used for quickly and safely cutting clothing or seat belts to access a patient's injuries.
- Penlight: Used to check pupils for responsiveness and to assist in examining wounds or the throat.
- Thermometer: To measure body temperature.
- Personal Protective Equipment (PPE): Includes gloves, masks, goggles, and gowns to protect EMTs from infection and prevent cross-contamination.
- Emergency Medical Kit (Jump Bag): Contains essential supplies like airway management tools (oral and nasal airways), tourniquets, burn dressings, and

sterile water or saline for irrigation.

- Communication Equipment: Devices like radios or smartphones to communicate with dispatch and other emergency services.
- Patient Transport Equipment: Includes stretchers and stair chairs to safely transport patients to the ambulance and then to the hospital.
- Proper training in the use of each tool is critical for EMTs to provide effective and safe care.

Outcome #2: Perform proper medical/trauma patient assessment/management for various disorders/emergencies at the novice EMT level.

National EMS Standards requires the novice EMT to be able to:

Apply knowledge to provide basic emergency care and transportation mode based on assessment findings and immediate needs of an acutely ill patient with:

- Abdominal and Gastrointestinal disorders
- Cardiovascular (Acute coronary syndrome, hypertensive emergencies, Aortic Aneurysm/dissection, thromboembolism, heat failure, and abnormal heart rhythm)
- Disorders of the eye, nose, ears, and throat)
- Endocrine disorders (diabetic emergencies, thyroid storm)
- Genitourinary/renal (complications from renal dialysis, urinary catheter management, kidney stones, and sexual assault),
- Hematology (sickle cell crisis, clotting disorders)
- Immunology (allergic and anaphylactic reaction
- Infectious Disease (management of a patient with an infectious disease, Sepsis, and septic shock, Covid and hoe to decontaminate the ambulance, equipment, and self)
- Neurology (decreased responsiveness, seizures, dementia vs delirium, headaches, and Alzheimer's)
- Musculoskeletal Injures/disorders (non-traumatic fractures, spinal injury, traumatic fracture)
- Psychiatric Behavior emergencies (patterns of violence, acute psychosis, suicide ideation, anxiety, depression, substance abuse and PTSD)
- Respiratory (respiratory arrest, upper airway obstruction, asthma, COPD, spontaneous pneumothorax, and pulmonary edema)
- Toxicology (opioid toxicity, carbon monoxide poisoning, Nerve agent poisoning, alcohol intoxication and withdrawal, inhaled or ingested poisons)
- Shock, cardiac arrest.
- Head and neck; abdominal and chest Trauma.

Outcome #3: Properly administer appropriate medications within the EMT B Scope of Practice.

State Licensure and NEMRT expects the student to have basic pharmacology knowledge related to frequently used medication, over the counter and prescribed.

- Medication safety procedures
- Medication legislation
- Common drug names, classification, storage, adverse reactions
- Routes of Medication
- Metabolism and excretion mechanism of action
- Drug compatibility.
- How to utilize medication reference and resource.

Outcome #4: Demonstrate team leadership skills.

National EMS Standards emphasize that:

- EMTs effective communication in a non-discriminatory manner that addresses inherent or unconscious bias, is culturally aware, sensitive, and intended to improve patient outcomes.
- Demonstrates professional behaviors including:
    - Integrity
    - empathy/compassion/ respect toward others
    - self-motivation
    - time management.
    - open communication
    - teamwork /diplomacy

Outcome #5: Communicate effectively and construct a well-written "run report."

National EMS Standards emphasize that:

- EMTs effective communication in a non-discriminatory manner that addresses inherent or unconscious bias, is culturally aware, sensitive, and intended to improve patient outcomes.
- Communicates with other health care professionals to include cohesive and organizational patient information when documenting assessments and treatments and orally reporting patient status.
- Utilizes electronic charting, EMS communication systems when documenting assessment and treatment.

Outcome #6: Abide by state, national, and local protocols governing EMTs.

- Safely and effectively performs all psychomotor skills within the National EMS Scope of Practice and State Scope of Practice.
- Follows all licensure requirements under the Oregon Health Authority:

	Immunizations, BLS, criminal background check, drug testing. Renew license keep license current, review state created pain modules at time of license renewal. • Adheres to HIPAA and patient confidentiality state and federal law. O**utcome #7: Be prepared to take the state and national EMT certification exams.** • Has completed all required course work and clinical practice hours to be eligible to take the NREMT exam to be certified as an EMT which them allows the person to apply for state licensure. • Has met all state requirements for licensure, (submitted drug screen, background check and Immunizations and BLS and submitted EMT certification form NREMT.)
Other:	An individual must pass the National Registry of Emergency Medical Technicians (NREMT) exam to be licensed as an Emergency Medical Technician (EMT). To be eligible for the exam, the candidate must provide proof of completing coursework aligned with the National EMS Education Standards, which ensure that certified professionals possess the essential skills for providing effective and safe pre-hospital care. Additionally, the candidate must have documented clinical hours in a hospital emergency room and further hours in a precepted ambulance ride along, responding to emergencies.

SECTION #3 IMPLEMENTATION	
Implementation term:	☒ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW		
"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."		
Submitter	Email	Date
Janie Griffin	jgriffin@cgcc.edu	5/1/2024
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director): Janie Griffin MN, RN		

NEXT STEPS:

EMT Part I

Course Number: EMS 105

Transcript Title: EMT Part I

Created: Aug 10, 2022

Updated: Dec 13, 2022

Total Credits: 6

Lecture Hours: 30

Lecture / Lab Hours: 40

Lab Hours: 30

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

IRW 115 (/courses/irw-115) or WR 115 (/courses/wr-115)or equivalent placement; placement into MTH 65 (/courses/mth-65); current HCP CPR card

Course Description

Introduces the role of the Emergency Medical Technician (EMT) at the novice level. Develops the necessary understanding of human anatomy and physiology, as well as knowledge of relevant medical terminology. Provides training in the identification and use of EMT equipment, the assessment of patient status and development of a patient plan, the use of appropriate interventions, and professional and interpersonal communication in the prehospital setting. Explores the use of evidence-based practices in the EMT field, and provides an introduction to the legal and ethical issues that may be encountered by the novice EMT. This is Part 1 of the 2-part Oregon EMT series. Course sequence requires a mandatory orientation, and passing a criminal background check and drug screen. Prerequisites: IRW 115 or WR 115 or equivalent placement; placement into MTH 65; current HCP CPR card. Audit available.

Course Outcomes

Students who successfully complete the course will:

1. Apply knowledge of basic anatomy and physiology of the human body and medical terminology as it relates to patient assessment in pre-hospital emergency situations.

2. Identify and use equipment needed to assess and care for the sick or injured patient at the novice EMT level
3. Assess patient status and analyze information in order to formulate a patient treatment plan at the novice EMT level.
4. Perform appropriate interventions at a novice EMT level.
5. Have a basic understanding of EMS communications systems and interpersonal communication as they relate to the prehospital setting.
6. Have an understanding of the legal requirements and obligations of an EMT.

Suggested Outcome Assessment Strategies

Because the role of an EMT often places the person in life and death circumstances, the assessment and grading of the students in this 2-class sequence will be held to the highest levels. Students must maintain an average of 70 or above on ALL written tests and prove mastery of ALL skill stations.

Students will be expected to complete assigned portions of the workbook and have it reviewed by the instructor on a regular basis. It is the responsibility of the student to keep up with missed assignments and tests.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped

classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Apply knowledge of basic anatomy and physiology of the human body and medical terminology as it relates to patient assessment in pre-hospital emergency situations.

- The components of medical terminology
  - Abbreviations and acronyms
  - Anatomic terms
    - Directional and positional terms
- Anatomy & Physiology
  - Locating body organs and structures
  - Body systems
    - Musculoskeletal
    - Respiratory
    - Cardiovascular
    - Nervous
    - Digestive
    - Integumentary
    - Endocrine

- Renal
- Reproductive

Outcome #2: Identify and use equipment needed to assess and care for the sick or injured patient at the novice EMT level

- Lifting and moving patients
  - Choosing a carrying device
  - Body mechanics
  - Airway adjuncts
    - OPA
    - NPA
  - Oxygen delivery
    - Nasal cannula
    - NRB Mask
    - BVM
- Suctioning
- AED
- Vital signs and monitoring devices
  - Sphygmomanometer
  - Stethoscope
  - Pulse oximetry
  - CBG monitoring

Outcome #3: Assess patient status and analyze scene information in order to formulate a patient treatment plan at the novice EMT level.

- Scene size up
  - Scene safety
  - Nature of the call
- Primary Assessment
  - Forming a general impression
  - The chief complaint
  - Mental status assessment
  - Assessment of the ABC's
  - Determining patient priority
- Secondary Assessment
  - Techniques of assessment
  - Specific examinations of body systems
- Assessment of the responsive patient
- Assessment of the unresponsive patient
- History gathering
- Critical thinking and decision making
  - How a clinician reaches a diagnosis
- Reassessment

Outcome #4: Perform appropriate interventions at a novice EMT level.

- Pharmacological interventions
  - Oxygen
  - Aspiring
  - Albuterol
  - Oral Glucose
  - Narcan
  - Eip 1:1000
- Airway management
- CPR / AED

Outcome #5: Provide safe and orderly transportation and appropriate transfer of patient care to hospital staff at the novice EMT level.

- Communication Systems
  - Radio communication
  - Radio reports
- Communication types
  - Interpersonal communication
  - Therapeutic communication
- Prehospital care report
  - Functions of the PCR
  - Elements of the PCR
  - Types of documentation

- Special documentation issues
    - POLST

Outcome #6: Utilize evidence-based practice in the care of the pre-hospital patient at the novice EMT level.

- Understanding legal issues as related to EMS
- Scope of practice
- Consent and refusal
- POLST, DNR and Power of Attorney
- Negligence
- Duty to act
- Good Samaritan law
- Confidentiality
- Crime scenes
- Mandatory reporting requirements

Suggested Texts and Materials

Suggested Texts/Materials:

- Emergency Care, 13th edition, by Limmer et al, ISBN: 9780134024554
- Workbook for Emergency Care, 13th edition, by Elling & Bergeron, ISBN: 9780134010731

Department Notes

Students must attend a mandatory orientation for information on personal and medical requirements for the course sequence. Students who wish to register after the mandatory orientation must contact the instructor for permission. Entire course sequence (EMS 105 and EMS 106) is offered once per year.

Note: only the CPR for HCP card is a pre-requisite for this course. Other clinical requirements as listed in the OHA rules must be met prior to any participation in a clinical setting during EMS 106. Clinical facilities must have time to process students prior to attendance in the clinical setting; therefore, students must complete these requirements prior to the start of EMS 106.

For a complete listing of administrative standards for health profession student clinical training, including required immunizations, TB screening, current AHA CPR for HCP card, and ability to pass a background & sex offender check and drug screening, see http://www.oregon.gov/oha/OHPR/Pages/sct.aspx (http://www.oregon.gov/oha/OHPR/Pages/sct.aspx)

Cost for the background check and drug screen is collected with course fees.

National Registry EMT https://www.nremt.org/ (https://www.nremt.org/)

National Registry EMT and Oregon EMT testing:

On completion of the entire EMS sequence (EMS 105 & EMS 106), students are eligible to apply for licensing testing. Applicants should be aware that to be eligible to take the NR-EMT exam, they must be 18 years old. In addition, the following questions are asked on the National Registry EMT and/or the Oregon EMT Application:

1. Do you or have you had within the past 10 years, any physical or mental condition that impairs, could impair, or has impaired your ability to perform the duties of an EMT? If you answer yes, explain whether your condition is controlled by medication or other treatment and how your condition treated or untreated, affects your ability to perform the duties of an EMT.
2. Do you or have you used in the last 10 years, any drug or chemical substance for other than legitimate medical purposes that impairs or has impaired your ability to perform the duties of an EMT?
3. Have you been counseled about, diagnosed with, or treated for, a dependency on alcohol or drugs within the last 10 years?
4. Have you ever been arrested, charged with, or convicted of any misdemeanor or felony? (Minor traffic violations need not be reported.)
5. Has an employer or supervising physician taken disciplinary action against you related to your duties as an EMT? (Discipline includes suspension, letter of reprimand, resignation in lieu of termination, a limitation or restriction of scope of practice or dismissal for cause.)
6. Have you been named in a lawsuit alleging medical malpractice or misconduct related to providing medical care?
7. Have you ever been disciplined, denied or revoked by the National Registry of EMTs or any health care certifying/licensing agency?
8. Have you ever surrendered or resigned a health care license or certificate?
9. Have you lived, worked, or attended school outside of Oregon for 60 or more consecutive days in the last 5 years?

EMT Part II

Course Number: EMS 106

Transcript Title: EMT Part II

Created: Aug 10, 2022

Updated: Dec 13, 2022

Total Credits: 6

Lecture Hours: 30

Lecture / Lab Hours: 40

Lab Hours: 30

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

EMS 105 (/courses/ems-105) with a "C" or better at CGCC within the previous 5 terms; current HCP CPR card

Course Description

Continues EMS 105. Develops the basic knowledge and skills necessary to treat victims of trauma, patients that present with special challenges, and sick and injured pediatrics. Expands knowledge and understanding of specific incidents that the Emergency Medical Technician may encounter in the field such as mass-casualty incidents, hazardous materials, motor vehicle collisions, and acts of terrorism. Includes preparation for state and national licensing exams. Requires meeting Oregon Health Authority Standards for health profession student clinical training, including immunizations, TB screening and the ability to pass a criminal background check and drug screen before placement into mandatory clinical observations in hospital emergency department and ambulance ride-along experience. Prerequisites: completion of EMS 105 with a “C” or better at CGCC within the previous 5 terms; current HCP CPR card.

Course Outcomes

Students who successfully complete the course will:

1. Identify and use tools needed to care for the sick and injured patient at an EMT level.

2. Perform proper medical/trauma patient assessment/management for various disorders/emergenciesat the novice EMT level.
3. Properly administer appropriate medications within the EMT B Scope of Practice.
4. Demonstrate team leadership skills.
5. Communicate effectively and construct a well-written “run report.”
6. Abide by state, national, and local protocols governing EMTs.
7. Be prepared to take the state and national EMT certification exams.

Suggested Outcome Assessment Strategies

Because the role of an EMT often places the person in life and death circumstances, the assessment and grading of the students in this class will be held to the highest levels. Students must maintain an average in the class on ALL written tests with a score of 70 or above and prove mastery of ALL skill stations.

Students will be expected to show completion of the entire workbook by the end of the course and have it reviewed by the instructor on a regular basis. It is the responsibility of the student to keep up with missed assignments and tests.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects,

service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Identify and use tools needed to care for trauma patient at the novice EMT level.

- Bandaging
  - Identify different types of bandages
  - Identify different types of dressings
  - Correct application of bandages and dressings
- Splinting
  - Identify types of splinting materials
  - Splinting procedures and application
  - Long back board
- Tourniquets
  - Indications for application
  - Proper placement

Outcome #2: Perform proper trauma patient assessment and appropriately manage a traumatic injury at the novice EMT level.

- Bleeding: external and internal

- Hypoperfusion
  - Causes
  - Types
  - Severity
  - Emergency care for shock
- Soft tissue trauma
  - Closed wound care
  - Treating specific types of open wounds
    - Abrasions
    - Lacerations
    - Penetrating trauma
    - Avulsions
    - Amputations
  - Burn injuries
    - Classification by agent and depth
    - Determining severity
    - Electrical and radiological burns
  - Chest and abdominal injuries
    - Treatment of closed injuries
    - Treatment of open injuries
- Musculoskeletal trauma
  - Mechanism of injury

- Assessment and treatment
  - Splinting of specific bones
  - Upper extremities
  - Lower extremities
  - Spine
  - Craniofacial injuries

Outcome #3: Demonstrate team leadership skills in regards to management of patient care.

- Delegation of Patient treatment tasks
- Facilitation of smooth and rapid treatment of patient

Outcome #4: Have a basic understanding of childbirth to be able to recognize an obstetric emergency vs. a normal birth and be able to assist in an out of hospital delivery.

- The female reproductive system
- Fertilization of the ovum
- Physiologic changes in pregnancy
  - The reproductive system
  - Effects on the female body
- Labor and delivery
  - Stages of labor
  - Assessment of the gravid patient
- Care and assessment of the neonate

- Care after delivery
  - Delivery of the placenta
  - Controlling vaginal bleeding
- Childbirth complications
  - Complications of delivery
- Emergencies in pregnancy
- Gynecological emergencies
- Non-traumatic and traumatic bleeding
- Assault

Outcome #5: Have a general knowledge of the differences in the assessment of and caring for a pediatric and geriatric patient at the novice EMT level.

- Developmental characteristics of the pediatric patient
  - Anatomic and physiologic differences
  - Interacting with the pediatric patient
  - Interacting with the adolescent patient
  - Assessing the pediatric patient
- Pediatric assessment triangle
  - Physical exam
- Special considerations
- Airway differences
  - Maintenance

    - Oxygen delivery
    - Choking
- BLS CPR differences
- Recognition and care of shock
- Injury patterns
- Child abuse
- Age-related changes in the geriatric patient
    - Communication and history taking challenges
    - Illness and injuries differences

Outcome #6: Demonstrate an introductory knowledge of Hazardous materials and traffic safety.

- Highway Emergency Operations
    - Safety when operation on a roadway
- Vehicle extrication
    - Vehicle stabilization
    - Gaining access
- Recognizing and managing hazards
- Hazardous materials
    - Response on a roadway
    - In relation to terrorism
    - Responses to a terrorist attack
        - Chemical

    - Biological
    - Radiological
    - Explosive
- In domestic situations
    - Farming
    - Households

Outcome #7: Demonstrate an understanding of how to care for environmental emergencies at the novice EMT level.

- Cold related injuries
    - Hypothermia
    - Localized cold injuries
- Heat related injuries
    - Heat cramps
    - Heat exhaustion
    - Heat stroke
- Water related accidents and injuries
    - Drowning
    - Diving
    - SCUBA
    - Water and ice rescue
- Bites and stings

- Insect
- Snake
- Marine

Suggested Texts and Materials

Suggested Texts/Materials:

- Emergency Care, 13th edition, by Limmer et al, ISBN: 9780134024554
- Workbook for Emergency Care, 13th edition, by Elling & Bergeron, ISBN: 9780134010731

Department Notes

If not beginning EMS 106 in the term immediately following successful completion of EMS 105, resubmission of evidence of meeting mandatory information, including a current AHA CRP for HCP card to the EMS Program Coordinator is required. Contact the department for details.

Note: Clinical requirements as listed in the OHA rules must be met prior to any participation in a clinical setting during EMS 106. Clinical facilities must have time to process students prior to attendance in the clinical setting; therefore, students must complete these requirements prior to the start of EMS 106.

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reprimand, resignation in lieu of termination, a limitation or restriction of scope of practice or dismissal for cause.)

6. Have you been named in a lawsuit alleging medical malpractice or misconduct related to providing medical care?
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COLUMBIA GORGE
COMMUNITY COLLEGE

The Dalles Campus
400 East Scenic Drive
The Dalles, OR 97058
Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20(
(541) 506-6000 (tel:5415066000)

Hood River Center
1730 College Way
Hood River, OR 97031-7502
Click address for directions/map. (https://maps.google.com/?q=1730%20College%20Way%0D%0AHood%20River%2C%20OR%2097031-7502%0D%0AClick%20address%20for%20directions%2Fmap.)

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	Aviation Maintenance Technology	Submitter name: phone: email:	Tyson M Aldrich taldrich@cgcc.edu
License/Certification Title:	FAA General Written	Granting Institution(s)/Agency(s):	FAA
Course Equivalency:	Course Title(s):	AMT 191, 192, 193, 194A, 194B, 195	
	Credits:	30 Total	
Potential application to current awards:	Aviation Airframe certificate, Aviation Powerplant certificate, Aviation Maintenance Technology certificate, Aviation Maintenance Technology AAS		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT

Alignment of Licensure/Certification requirements to course outcomes:

AMT 191 Aviation Maintenance: General 101

Description: Introduces aircraft cleaning, corrosion control, materials, and aircraft hardware. Covers the selection of appropriate cleaning chemicals and processes. Describes the identification, selection, and installation of aircraft hardware, fluid lines, and fittings. Examines the performance of aircraft processes such as heat treating and hardness testing. Prerequisites: MTH 65 or equivalent placement; placement into IRW 115 or WR 115. Audit available.

Outcomes/content:

Outcome #1: Identify and select aircraft materials used in performing aircraft cleaning and corrosion control, fluid line maintenance, and non-destructive inspection of ferrous and non-ferrous materials.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.I.G.K1 Aircraft cleaning procedures.
- AM.I.G.K2 Corrosion theory and causation.
- AM.I.G.K3 Types and effects of corrosion.
- AM.I.G.K4 Corrosion-prone areas in aircraft.
- AM.I.G.K5 Corrosion preventive maintenance procedures.
- AM.I.G.K6 Corrosion identification and inspection.
- AM.I.G.K7 Corrosion removal and treatment procedures.
- AM.I.G.K8 Corrosion preventive compounds (CPC) (e.g., waxy sealants, thin-film dielectrics).
- AM.I.G.K9 Selection of optimal CPC and frequency of treatment.

	• AM.I.G.K10 Use of high-pressure application equipment. • AM.I.G.K11 Improper use of cleaners on aluminum or composite materials. AM.I.G.K12 Dissimilar metals causing accelerated corrosion and role of protective barriers to mitigate this risk. • AM.I.G.K13 Conversion coatings. • AM.I.G.K14 Materials used for protection of airframe structures. • AM.I.G.K15 Primer materials. • AM.I.G.K16 Topcoat materials. • AM.I.G.K17 Surface preparation for a desired finishing material. • AM.I.G.K18 Effects of ambient conditions on finishing materials. • AM.I.G.K19 Effects of improper surface preparation on finishing materials. AM.I.G.K20 Regulatory requirements for replacing identification, registration markings, and placards. • AM.I.G.K21 Inspection of aircraft finishes. • AM.I.G.K22 Safety practices/precautions when using finishing materials (e.g., PPE, fire prevention). • AM.I.G.K23 Finishing materials application techniques and practices. • AM.I.G.K24 Control surface balance considerations after refinishing. **Outcome 2: Apply FAA acceptable methods, techniques, and practices during aircraft maintenance operations.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2 • AM.I.I.K1 Privileges and limitations of a mechanic certificate. • AM.I.I.K2 Recent experience requirements and how to re-establish once lost. • AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations. • AM.I.I.K4 Maintenance record entry for approval for return to service after inspection. • AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3). • AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair). • AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor. • AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics. • AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD). • AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD. • AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.

- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.
- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
- AM.I.I.K19 Inoperative equipment.
- AM.I.I.K20 Discrepancy records or placards.
- AM.I.I.K21 Usable on (effectivity) codes in parts manuals.
- AM.I.I.K22 Methods used to establish the serial number effectivity of an item.
- AM.I.I.K23 Mechanic address change notification procedures

Outcome 3: Utilize appropriate non-destructive testing methods commonly employed in the aircraft industry.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.K.K3 Nondestructive Testing (NDT) procedures and methods.
- AM.I.K.K4 Aircraft inspection programs (e.g., progressive, 100-hour, annual, and other FAA-approved inspections).
- AM.I.K.K5 Aircraft inspection methods and tools for materials, hardware, and processes.

Outcome 4: Apply math and physics principles in solving problems associated with aviation maintenance.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 4

- AM.I.H.K1 Areas of various geometrical shapes.
- AM.I.H.K2 Volumes of various geometrical shapes.
- AM.I.H.K3 Definitions, descriptions and use of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse.
- AM.I.H.K4 Ratio problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
- AM.I.H.K5 Proportion and percentage problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
- AM.I.H.K6 Algebraic operations, including examples of where or how they

may be used in relation to aircraft maintenance.

- AM.I.H.K7 Conditions or areas in which metric conversion may be necessary.
- AM.I.H.K8 Scientific (exponential) notation, decimal notation, fractional notation, binary notation, and conversion between these various forms of numeric notation.
- AM.I.H.K9 Rounding numbers.
- AM.I.H.K10 Powers and special powers.
- AM.I.H.K11 Measurement systems.
- AM.I.H.K12 Use of positive and negative integers in mathematical operations.
- AM.I.H.K13 Basic mathematic functions (addition, subtraction, multiplication, division).

AMT 192 Aviation Maintenance: General 102

Description: Examines the government's involvement in aviation maintenance, and FAA regulations regarding aviation maintenance and approved training programs. Emphasizes the use of maintenance publications, maintenance forms and records, and technicians' privileges and limitations. Addresses aircraft weight and balance procedures and associated record keeping, aircraft drawings and ground operations and servicing. Prerequisite: AMT 191. Audit available.

Outcomes/content:

Outcome 1: Use aircraft drawings and other graphic information in performing aircraft maintenance and alterations.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.I.B.K1 Drawings, blueprints, sketches, charts, graphs, and system schematics, including commonly used lines, symbols, and terminology.
- AM.I.B.K2 Repair or alteration of an aircraft system or component(s) using drawings, blueprints, or system schematics to determine whether it conforms to its type design.
- AM.I.B.K3 Inspection of an aircraft system or component(s) using drawings, blueprints, or system schematics.
- AM.I.B.K4 Terms used in conjunction with aircraft drawings, blueprints, or system schematics.

Outcome 2: Perform a complete aircraft weight and balance procedure, including preparation of required documentation and records.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.C.K1 Weight and balance terminology.
- AM.I.C.K2 Purpose for weighing an aircraft.
- AM.I.C.K3 Weighing procedures, including the general preparations for weighing, with emphasis on aircraft weighing area considerations.
- AM.I.C.K4 Procedures for calculation of the following: arm, positive or negative moment, center of gravity (CG), or moment index.

- AM.I.C.K5 Purpose and application of weight and CG limits.
- AM.I.C.K6 Purpose of determining CG.
- AM.I.C.K7 Adverse loading considerations and how to calculate if adverse loading causes an out-of-limit condition.
- AM.I.C.K8 Determine proper empty weight configuration. AM.I.C.K9 Proper ballast placement.
- AM.I.C.K10 Jacking an aircraft.

Outcome 3: Identify typical ground operation hazards when moving, securing and servicing aircraft.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.F.K1 Aircraft towing procedures.
- AM.I.F.K2 Aircraft securing procedures.
- AM.I.F.K3 Aviation fueling/defueling procedures.
- AM.I.F.K4 Airport operation area procedures and ATC communications, including runway incursion prevention.
- AM.I.F.K5 Engine starting, ground operation, and aircraft taxiing procedures.

Outcome 4: Demonstrate ability to read, comprehend and apply information contained in FAA and manufacturer's aircraft specifications and other airworthiness directives and advisory materials.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 4

- AM.I.I.K1 Privileges and limitations of a mechanic certificate.
- AM.I.I.K2 Recent experience requirements and how to re-establish once lost. AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations.
- AM.I.I.K4 Maintenance record entry for approval for return to service after inspection.
- AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
- AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and

supplemental type certificates.

- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
- AM.I.I.K19 Inoperative equipment.
- AM.I.I.K20 Discrepancy records or placards.
- AM.I.I.K21 Usable on (effectivity) codes in parts manuals.
- AM.I.I.K22 Methods used to establish the serial number effectivity of an item.

Outcome 5: Identify and implement aircraft requirements for safe starting, ground operation and movement, servicing and securing.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 5

- AM.I.F.K1 Aircraft towing procedures.
- AM.I.F.K2 Aircraft securing procedures.
- AM.I.F.K3 Aviation fueling/defueling procedures.
- AM.I.F.K4 Airport operation area procedures and ATC communications, including runway incursion prevention.
- AM.I.F.K5 Engine starting, ground operation, and aircraft taxiing procedures
- AM.I.F.K8 Oxygen system servicing procedures.
- AM.I.F.K9 Characteristics of aviation gasoline and turbine fuels, including basic types and means of identification.
- AM.I.F.K10 Fuel additives commonly used in the field.
- AM.I.F.K11 Use of approved grades/types of fuel in aircraft engines.
- AM.I.F.K12 Tool and hardware use and accountability.
- AM.I.F.K13 Material handling.
- AM.I.F.K14 Parts protections.
- AM.I.F.K15 Hazardous materials, Safety Data Sheets (SDS), and PPE. AM.I.F.K16 Foreign object damage effects.

AMT 193 Aviation Maintenance: General 103

Description: Examines the theory and application of basic DC and AC electrical concepts, definitions, and laws. Introduces passive electrical components, electrical sources, schematic symbols, and electrical wiring diagrams. Explains the methods of safe and accurate measurement of DC and AC electrical quantities using basic electrical test equipment. Provides troubleshooting defective components, observing

	the characteristics of electrical components in test circuits, and wiring circuits from schematic diagrams. Prerequisites: AMT 192. Audit available. **Outcomes/content:** **Outcome 1: Apply electrical theory to aircraft systems and components.** **Outcome 2: Identify and apply the factors affecting voltage, resistance and current to aircraft electrical circuits.** **Outcome 3: Measure and calculate electrical power.** **Outcome 4: Identify electrical components and interpret wiring diagrams.** **Outcome 5: Demonstrate electrical testing and monitoring instruments for aircraft electrical circuits.** **Outcome 6: Calculate and measure capacitance and inductance.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1-6 • AM.I.A.K1 Electron theory (conventional flow vs. electron flow). • AM.I.A.K2 Magnetism. • AM.I.A.K3 Capacitance in a circuit. • AM.I.A.K4 Inductance in a circuit. • AM.I.A.K5 Alternating current (AC) electrical circuits. • AM.I.A.K6 Direct current (DC) electrical circuits. • AM.I.A.K7 Electrical laws and theory. • AM.I.A.K7a a. Ohm's Law • AM.I.A.K7b b. Kirchhoff's Laws • AM.I.A.K7c c. Watt's Law • AM.I.A.K7d d. Faraday's Law • AM.I.A.K7e e. Lenz's Law • AM.I.A.K7f f. Right-hand motor rule • AM.I.A.K8 Electrical measurement tools, principles, and procedures. • AM.I.A.K9 Voltage. • AM.I.A.K9a a. Regulation • AM.I.A.K10 Current. • AM.I.A.K11 Resistance. • AM.I.A.K11a a. Impedance • AM.I.A.K11b b. Resistance in series • AM.I.A.K11c c. Resistance in parallel • AM.I.A.K11d d. Total resistance • AM.I.A.K12 Power. • AM.I.A.K13 Series circuits. • AM.I.A.K14 Parallel circuits. • AM.I.A.K15 Aircraft batteries. • AM.I.A.K16 Transformers. • AM.I.A.K17 Circuit continuity. • AM.I.A.K18 Controlling devices, including switches and relays.

- AM.I.A.K19 Protective devices, including fuses, circuit breakers, and current limiters.
- AM.I.A.K20 Resistor types and color coding.
- AM.I.A.K21 Semiconductors, including diodes, transistors, and integrated circuits.

AMT 194A Aviation Maintenance: General 104A

Description: Explores airframe electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the application of electrical principles used in sensing, indicating and control of airframe systems. Prerequisites: AMT 193. Audit available.

Outcomes/content:

Outcome 1: Repair and inspect aircraft electrical system components.

Outcome 2: Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1-2

- AM.I.A.S1 Perform circuit continuity test.
- AM.I.A.S2 Measure voltage.
- AM.I.A.S3 Measure current.
- AM.I.A.S4 Measure resistance.
- AM.I.A.S5 Test a switch or relay.
- AM.I.A.S6 Test a fuse or circuit breaker.
- AM.I.A.S7 Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
- AM.I.A.S8 Troubleshoot a circuit.
- AM.I.A.S9 Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
- AM.I.A.S10 Demonstrate how to test for short-circuit and open-circuit conditions.
- AM.I.A.S11 Measure voltage drop across a resistor.
- AM.I.A.S12 Determine or measure for open electrical circuits.
- AM.I.A.S13 Inspect an aircraft battery.
- AM.I.A.S14 Service an aircraft battery.

Outcome 3: Read and interpret aircraft circuit diagrams.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.A.K25 Electrical circuit drawings

AMT194B Aviation Maintenance: General 104B

Description: Explores engine electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the

application of electrical principles used in sensing, indicating and control of powerplant systems. Prerequisite/concurrent: AMT 194A. Audit available.

Outcomes/content:

Outcome 1: inspect, check, and troubleshoot constant speed and integrated speed drive generators.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.I.A.K25 Electrical circuit drawings.
- AM.I.A.K26 Complex/combined circuits.
- AM.I.A.K27 AC and DC motors.
- AM.III.F.K1 Generators.
- AM.III.F.K2 Alternators.
- AM.III.F.K3 Starter generators.
- AM.III.F.K4 Voltage regulators and overvoltage and overcurrent protection. AM.III.F.K5 DC generation systems.
- AM.III.F.K6 AC generation systems.

Outcome 2: Repair engine electrical system components.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.III.F.S1 Inspect engine electrical wiring, switches, and protective devices.
- AM.III.F.S2 Determine suitability of a replacement component by part number.
- AM.III.F.S3 Replace an engine-driven generator or alternator.
- AM.III.F.S4 Inspect an engine-driven generator or alternator in accordance with manufacturer's instructions.
- AM.III.F.S5 Troubleshoot an aircraft electrical generating system.
- AM.III.F.S6 Remove and install an engine direct-drive electric starter.
- AM.III.F.S7 Troubleshoot a direct-drive electric starter system.

Outcome 3: Install and service engine electrical wiring, controls, switches, indicators and protective devices.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.A.S1 Perform circuit continuity test.
- AM.I.A.S2 Measure voltage.
- AM.I.A.S3 Measure current.
- AM.I.A.S4 Measure resistance.
- AM.I.A.S5 Test a switch or relay.
- AM.I.A.S6 Test a fuse or circuit breaker.
- AM.I.A.S7 Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
- AM.I.A.S8 Troubleshoot a circuit.

- AM.I.A.S9 Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
- AM.I.A.S10 Demonstrate how to test for short-circuit and open-circuit conditions.
- AM.I.A.S11 Measure voltage drop across a resistor.
- AM.I.A.S12 Determine or measure for open electrical circuits.
- AM.I.A.S13 Inspect an aircraft battery.
- AM.I.A.S14 Service an aircraft battery.

AMT 195 Aviation Maintenance: General 105

Description: Examines the use of mechanical and electronic systems in sensing, communicating, and displaying information. Explores solid state and digital devices, sensors, and special circuits used in aircraft instrumentation systems, fuel systems and fire protection systems. Analyzes the methods used in testing, inspecting, and troubleshooting those systems. Prerequisites: AMT 194 or (AMT 194A and AMT 194B). Audit available.

Outcomes/content:

Outcome 1: Apply the principles of operation and system troubleshooting methods for aircraft and engine instruments.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.III.D.K1 Fuel flow.
- AM.III.D.K2 Temperature (e.g., exhaust gas, oil, oil cylinder head, turbine inlet).
- AM.III.D.K3 Engine speed indicating systems.
- AM.III.D.K4 Pressure (e.g., air, fuel, manifold, oil).
- AM.III.D.K5 Annunciator indicating systems (e.g., warning, caution, and advisory lights).
- AM.III.D.K6 Torquemeters.
- AM.III.D.K7 Engine pressure ratio (EPR).
- AM.III.D.K8 Engine indicating and crew alerting system (EICAS).
- AM.III.D.K9 Digital engine control module (e.g., full authority digital engine controls (FADEC)).
- AM.III.D.K10 Electronic centralized aircraft monitor (ECAM).
- AM.III.D.K11 Engine instrument range markings and instrument conditions.

Outcome2: Apply electrical schematics to troubleshoot and repair aircraft fire protection systems.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.B.R3 Applicability of the drawing or schematic to the particular aircraft by model and serial number.

	Outcome 3: Perform airframe and engine conformity inspections. **Outcome 4: Identify, troubleshoot and repair aircraft and engine fuel systems.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3 & 4 • AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations. • AM.I.I.K4 Maintenance record entry for approval for return to service after inspection. • AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3). • AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair). • AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor. • AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics. • AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD). • AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD. • AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists. • AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates. • AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices. • AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals. • AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator. • AM.I.I.K16 Difference between approved data and acceptable data, and when each is required. • AM.I.I.K17 FAA-approved airworthiness limitations. • AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals. • AM.I.I.K19 Inoperative equipment. • AM.I.I.K20 Discrepancy records or placards. • AM.I.I.K21 Usable on (effectivity) codes in parts manuals. • AM.I.I.K22 Methods used to establish the serial number effectivity of an item.

Other:	The Student must have a passing score of at least 85% on the FAA General Written. The FAA only requires 70% to pass, however a score of 85% or better demonstrates that the student has a firm grasp of the foundational knowledge needed to progress in the AMT program.

SECTION #3 IMPLEMENTATION	
Implementation term:	☒ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW

"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."

Submitter	Email	Date
Tyson M Aldrich	taldrich@cgc.edu	04/29/2024
Department Chair (enter name of department chair): Jim Pytel		
Department Dean/Director (enter name of department dean/director): Robert Wells-Clark		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
2. Refer to the curriculum office website for the Curriculum Committee meeting schedule and submission deadlines. You are encouraged to send submissions prior to the deadline so that the curriculum office may review and provide feedback.
3. Course submissions will be placed on the next agenda with available time slots. You will be notified of your submission's time for review, and you will be sent a signature page that may be completed electronically or manually by your department chair and department dean. It is the submitter's responsibility to ensure that completed signature pages are delivered to the Curriculum Office the day before the Curriculum Committee meeting for which the submission is scheduled. Submissions without signed signature pages will be postponed.
4. It is not mandatory that you attend the Curriculum Committee meeting in which your submission is scheduled for review; however, it is strongly encouraged that you attend so that you may represent your submission and respond to any committee questions. Unanswered questions may result in a submission being rescheduled for further clarification.

Aviation Maintenance: General 101

Course Number: AMT 191

Transcript Title: Aviation Maintenance: General 101

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

Placement into IRW 115 (/courses/irw-115) or WR 115 (/courses/wr-115); MTH 65 (/courses/mth-65) or equivalent placement

Course Description

Introduces aircraft cleaning, corrosion control, materials, and aircraft hardware. Covers the selection of appropriate cleaning chemicals and processes. Describes the identification, selection, and installation of aircraft hardware, fluid lines, and fittings. Examines the performance of aircraft processes such as heat treating and hardness testing. Prerequisites: MTH 65 or equivalent placement; placement into IRW 115 or WR 115. Audit available.

Course Outcomes

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

1. Identify and select aircraft materials used in performing aircraft cleaning and corrosion control, fluid line maintenance, and non-destructive inspection of ferrous and non-ferrous materials.
2. Apply FAA acceptable methods, techniques, and practices during aircraft maintenance operations.

3. Utilize appropriate non-destructive testing methods commonly employed in the aircraft industry.
4. Apply math and physics principles in solving problems associated with aviation maintenance.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Identify and select aircraft materials used in performing aircraft cleaning and corrosion control, fluid line maintenance, and non-destructive inspection of ferrous and non-ferrous materials.

- Identify appropriate cleaning materials, understanding their characteristics, use and effect
- Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning
- Inspect and check welds
- Fabricate and install rigid and flexible fluid lines and fittings
- Identify and select appropriate nondestructive testing methods

Outcome #2: Apply FAA acceptable methods, techniques, and practices during maintenance operations.

- Select and install aircraft hardware using appropriate power tools and shop equipment
- Perform basic heat treating processes
- Perform precision measurements
- Determine correct torque valve for aircraft nuts and bolts
- Identify characteristics of materials that affect its ability to be hammered, rolled or pressed

Outcome #3: Utilize appropriate non-destructive testing methods commonly employed in the aircraft industry.

- Perform dye penetrant, eddy current, ultrasonic and magnetic particle inspections
- Identify procedures used in demagnetizing steel parts
- Identify heat-treated and non-heat-treated aluminum alloys
- Perform magnetic particle inspection methods on engine crankshaft

- Identify the effects of heat treatment on aluminum alloy corrosion resistance

Outcome #4: Apply math and physics principles in solving problems associated with aviation maintenance.

- Apply the principles of physics as it relates to sound, fluid and heat dynamics, aircraft structures, and basic aerodynamics
- Calculate measurements and fluid mixing ratios
- Read and interpret a Vernier micrometer scale
- Identify effect of atmospheric temperature and humidity on airfoil lift
- Understand the relationship between pressure, volume and temperature on an air mass

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

Related Instruction

Computation: 31.5 Hours

Outcomes

2. Apply FAA acceptable methods, techniques, and practices during maintenance operations.

4. Apply math and physics principles in solving problems associated with aviation maintenance.

Content

- Perform precision measurements (RI hours 4.5)
- Apply the principles of physics as it relates to sound, fluid and heat dynamics, aircraft structures, and basic aerodynamics (RI hours 6)
- Calculate measurements and fluid mixing ratios (RI hours 6)
- Read and interpret a Vernier micrometer scale (RI hours 6)
- Identify effect of atmospheric temperature and humidity on airfoil lift (RI hours 4.5)
- Understand the relationship between pressure, volume and temperature on an air mass (RI hours 4.5)

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(541) 506-6000 (tel:5415066000)

Aviation Maintenance: General 102

Course Number: AMT 192

Transcript Title: Aviation Maintenance: General 102

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 191 (/courses/amt-191)

Course Description

Examines the government's involvement in aviation maintenance, and FAA regulations regarding aviation maintenance and approved training programs. Emphasizes the use of maintenance publications, maintenance forms and records, and technicians' privileges and limitations. Addresses aircraft weight and balance procedures and associated record keeping, aircraft drawings and ground operations and servicing. Prerequisite: AMT 191. Audit available.

Course Outcomes

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

1. Use aircraft drawings and other graphic information in performing aircraft maintenance and alterations.
2. Perform a complete aircraft weight and balance procedure, including preparation of required documentation and records.
3. Identify typical ground operation hazards when moving, securing and servicing aircraft.

4. Demonstrate ability to read, comprehend and apply information contained in FAA and manufacturer's aircraft specifications and other airworthiness directives and advisory materials.
5. Identify and implement aircraft requirements for safe starting, ground operation and movement, servicing and securing.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Use aircraft drawings and other graphic information in performing aircraft maintenance and alterations.

- Identify aircraft drawings, symbols and system schematics
- Draw sketches of repairs and alterations
- Utilize blueprint information
- Understand graphs and charts

Outcome #2: Perform a complete aircraft weight and balance procedure, including preparation of required documentation and records.

- Use aircraft specifications for weighting purposes
- Perform complete weight and balance check and record data.
- Determine the forward and rearward C.G. limit on a specified aircraft
- Calculate the maximum cargo or baggage weight an aircraft can carry
- Locate information to compute weight and balance

Outcome #3: Identify typical ground operation hazards when moving, securing and servicing aircraft.

- Start, operate, move and secure aircraft
- Identify ground operation hazards
- Identify and select appropriate fuels
- Apply procedures for extinguishing fires in induction systems
- Operate external ground power units and hydraulic units

Outcome #4: Demonstrate ability to read, comprehend and apply information contained in FAA and manufacturer's aircraft specifications and other airworthiness directives and advisory materials.

- Find specified information in technical reports and manuals
- Identify purpose and applicability of Technical Standard Orders
- Identify useful load and empty weight using data and specifications
- Define “overhaul”, “repair”, “service” and “inspect” as it relates to aircraft maintenance

Outcome #5: Identify and implement aircraft requirements for safe starting, ground operation and movement, servicing and securing.

- Protect fuel systems from contamination
- Tie down and secure aircraft
- Apply procedures for extinguishing fires in induction systems
- Use hand signals to direct aircraft movement

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

Related Instruction

Computation: 21 Hours

Outcomes

1. Use aircraft drawings and other graphic information in performing aircraft maintenance and alterations.
2. Perform a complete aircraft weight and balance procedure, including preparation of required documentation and records.

Content

- Understand graphs and charts (RI hours 4.5)
- Perform complete weight and balance check and record data (RI hours 6)
- Determine the forward and rearward C.G. (center of gravity) limit on a specified aircraft (RI hours 6)
- Calculate the maximum cargo or baggage weight an aircraft can carry (RI hours 4.5)

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(541) 506-6000 (tel:5415066000)

Hood River Center
1730 College Way
Hood River, OR 97031-7502

Aviation Maintenance: General 103

Course Number: AMT 193

Transcript Title: Aviation Maintenance: General 103

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 192 (/courses/amt-192)

Course Description

Examines the theory and application of basic DC and AC electrical concepts, definitions, and laws. Introduces passive electrical components, electrical sources, schematic symbols, and electrical wiring diagrams. Explains the methods of safe and accurate measurement of DC and AC electrical quantities using basic electrical test equipment. Provides troubleshooting defective components, observing the characteristics of electrical components in test circuits, and wiring circuits from schematic diagrams. Prerequisites: AMT 192. Audit available.

Course Outcomes

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

1. Apply electrical theory to aircraft systems and components.
2. Identify and apply the factors affecting voltage, resistance and current to aircraft electrical circuits.
3. Measure and calculate electrical power.
4. Identify electrical components and interpret wiring diagrams.

5. Demonstrate electrical testing and monitoring instruments for aircraft electrical circuits.
6. Calculate and measure capacitance and inductance.

Suggested Outcome Assessment Strategies

The determination of assessment strategies is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: writings (journals, self-reflections, pre writing exercises, essays), quizzes, tests, midterm and final exams, group projects, presentations (in person, videos, etc), self-assessments, experimentations, lab reports, peer critiques, responses (to texts, podcasts, videos, films, etc), student generated questions, Escape Room, interviews, and/or portfolios.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Apply electrical theory to aircraft systems and components.

- Determine the basic operating principles of AC and DC electrical instruments and galvanometer
- Understand the meaning of the mathematical prefixes used with electrical quantities
- Identify and use common electrical symbols during the analysis of basic electrical circuits
- Determine power requirements of a circuit when voltage and resistance are known

Outcome #2: Identify and apply the factors affecting voltage, resistance and current to aircraft electrical circuits.

- Use an ohmmeter to check continuity and shorted circuits
- Determine power requirements of a circuit when voltage and resistance are known
- The factors that affect the voltage drop in an electrical conductor
- Identify the factors that affect the voltage drop in an electrical conductor

Outcome #3: Measure and calculate electrical power.

- Determine the power furnished by a generator to an electrical system
- Calculate Ohms Law problems for current, voltage, resistance and voltage drop in series, parallel and complex circuits

- Determine the power requirements of an electrical motor at a specified efficiency and load
- The relationship of power and phase in AC circuits

Outcome #4: Identify electrical components and interpret wiring diagrams.

- Trace electrical circuits using circuit diagrams
- Identify electrical circuits and symbols using wiring diagrams
- Understand the function of resistors, thermistors, thermocouples, switches, circuit protection and Wheatstone bridges

Outcome #5: Demonstrate electrical testing and monitoring instruments for aircraft electrical circuits.

- Connect voltmeters and ammeters into electrical circuits.
- Determine the purpose of a shunt resistor when used with an ammeter.
- Describe the effects of connecting cells in series or parallel
- Determine the power the power furnished by a generator to an electrical system
- Identify the power requirements of an electrical motor at a specific efficiency and load

Outcome #6: Calculate and measure capacitance and inductance.

- The effect of capacitive and inductive reactance in an electrical circuit
- The cause, effect and prevention of counter-EMF

- The interrelationship of capacitive and inductive reactance for high/low frequency filtration and frequency resonance
- The relationship of total impedance to an AC electrical circuit

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

Related Instruction

Computation: 48 Hours

Outcomes

1. Apply electrical theory to aircraft systems and components.
2. Identify and apply the factors affecting voltage, resistance and current to aircraft electrical circuits.
3. Measure and calculate electrical power.

6. Calculate and measure capacitance and inductance.

Content

- Understand the meaning of the mathematical prefixes used with electrical quantities (RI hours 4.5)
- Determine power requirements of a circuit when voltage and resistance are known (RI hours 4.5)
- Determine the power furnished by a generator to an electrical system (RI hours 6)
- Calculate Ohms Law problems for current, voltage, resistance and voltage drop in series, parallel and complex circuits (RI hours 7.5)
- Determine the power requirements of an electrical motor at a specified efficiency and load (RI hours 6)
- The effect of capacitive and inductive reactance in an electrical circuit (RI hours 7.5)
- The interrelationship of capacitive and inductive reactance for high/low frequency filtration and frequency resonance (RI hours 7.5)
- The relationship of total impedance to an AC electrical circuit (RI hours 4.5)

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Aviation Maintenance: General 104A

Course Number: AMT 194A

Transcript Title: Aviation Maintenance: General 104A

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 66

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 193 (/courses/amt-193)

Course Description

Explores airframe electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the application of electrical principles used in sensing, indicating and control of airframe systems. Prerequisites: AMT 193. Audit available.

Course Outcomes

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

1. Repair and inspect aircraft electrical system components.
2. Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.
3. Read and interpret aircraft circuit diagrams.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Repair and inspect aircraft electrical system components.

- Crimp and splice wiring to manufacturers' specifications
- Repair pins and sockets of aircraft connectors
- Use a multi-meter for diode inspection
- Select and install electrical bonding jumpers

Outcome #2: Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.

- Explain switch, fuse and circuit breaker derating factors
- Determine applicability of electrical wire size and current-carrying capacity
- Install electrical wiring in conduits
- Select and install electrical bonding jumpers
- Install and remove terminals, pins and sockets

Outcome #3: Read and interpret aircraft circuit diagrams.

- Trace electrical circuit logic in wiring diagrams
- Utilize multi-meter for diode and transistor inspection
- Apply principles of AC rectification with diodes
- Utilize Zener diodes for voltage regulation

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

Related Instruction

Computation: 4 Hours

Outcomes

2. Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.

Content

- Determine applicability of electrical wire size and current-carrying capacity (RI hours 4)

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(541) 506-6000 (tel:5415066000)

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Hood River, OR 97031-7502
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Aviation Maintenance: General 104B

Course Number: AMT 194B

Transcript Title: Aviation Maintenance: General 104B

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 66

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 194A (/courses/amt-194a)

Course Description

Explores engine electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the application of electrical principles used in sensing, indicating and control of powerplant systems. Prerequisite/concurrent: AMT 194A. Audit available.

Course Outcomes

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

1. Inspect, check, and troubleshoot constant speed and integrated speed drive generators.
2. Repair engine electrical system components.
3. Install and service engine electrical wiring, controls, switches, indicators and protective devices.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Inspect, check, and troubleshoot constant speed and integrated speed drive generators.

- Apply principles and architecture of AC and DC generators
- Operate vibrator style, solid state and carbon-pile voltage regulators
- Control output frequency and voltage of alternating current generators
- Understand purpose of reverse-current cutout relay and effects of sticking points

Outcome #2: Repair engine electrical system components.

- Explain switch, fuse and circuit breaker derating factors
- Determine applicability of electrical wire: size and current-carrying capacity
- Understand requirements of a bonding jumper in carrying ground load
- Install and remove terminals, pins and sockets

Outcome #3: Install and service engine electrical wiring, controls, switches, indicators and protective devices.

- Install and wire electrical switches, fuses and circuit breakers
- Determine electrical maximum and continuous load of a circuit
- Explain the purpose of shielding electrical wiring and equipment
- Check armatures for grounds, shorts and opens
- Apply methods for reducing armature reaction

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration;
Introduction to Aircraft Maintenance, 3rd Edition, Avotek

Related Instruction

Computation: 16 Hours

Outcomes

1. Inspect, check, and troubleshoot constant speed and integrated speed drive generators.
2. Repair engine electrical system components.
3. Install and service engine electrical wiring, controls, switches, indicators and protective devices.

Content

- Apply principles and architecture of AC and DC generators (RI hours 6)
- Control output frequency and voltage of alternating current generators (RI hours 6)
- Determine electrical maximum and continuous load of a circuit (RI hours 4)

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The Dalles Campus
400 East Scenic Drive
The Dalles, OR 97058
Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20
(541) 506-6000 (tel:5415066000)

Aviation Maintenance: General 105

Course Number: AMT 105

Transcript Title: Aviation Maintenance: General 105

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 194 or (AMT 194A (/courses/amt-194a) and AMT 194B (/courses/amt-194b))

Course Description

Examines the use of mechanical and electronic systems in sensing, communicating, and displaying information. Explores solid state and digital devices, sensors, and special circuits used in aircraft instrumentation systems, fuel systems and fire protection systems. Analyzes the methods used in testing, inspecting, and troubleshooting those systems. Prerequisites: AMT 194 or (AMT 194A and AMT 194B). Audit available.

Course Outcomes

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

1. Apply the principles of operation and system troubleshooting methods for aircraft and engine instruments.
2. Apply electrical schematics to troubleshoot and repair aircraft fire protection systems.
3. Perform airframe and engine conformity inspections.
4. Identify, troubleshoot and repair aircraft and engine fuel systems.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Apply the principles of operation and system troubleshooting methods for aircraft and engine instruments.

- Inspect, service, troubleshoot, and repair electronic flight instrument systems
- Inspect, service, troubleshoot, and repair both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems to include the use of built-in test equipment
- Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems

- Inspect, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and r.p.m. indicating systems

Outcome #2: Apply electrical schematics to troubleshoot and repair aircraft fire protection systems.

- Inspect, check, and service smoke and carbon monoxide detection systems
- Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems
- Determine the causes of system malfunctions
- Check fire warning sensors or detectors for open or short circuits

Outcome #3: Perform airframe and engine conformity inspections.

- Determine condition of airframe systems and components
- Determine that aircraft conforms to FAA specifications
- Conduct detailed inspection: 100-hour inspection
- Determine when progressive inspections are necessary

Outcome #4: Identify, troubleshoot and repair aircraft and engine fuel systems.

- Check and service fuel dump systems
- Perform fuel management transfer, and defueling
- Inspect, check, and repair pressure fueling systems
- Repair aircraft fuel system components
- Inspect and repair fluid quantity indicating systems

- Troubleshoot, service, and repair fluid pressure and temperature warning systems
- Inspect, check, service, troubleshoot, and repair aircraft fuel systems

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration;

Introduction to Aircraft Maintenance, 3rd Edition, Avotek

COLUMBIA GORGE
COMMUNITY COLLEGE

The Dalles Campus

400 East Scenic Drive

The Dalles, OR 97058

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(541) 506-6000 (tel:5415066000)

Hood River Center

1730 College Way

Hood River, OR 97031-7502

Click address for directions/map. (https://maps.google.com/?q=1730%20College%20Way%0D%0AHood%20River%2C%20OR%2097031-7502%0D%0AClick%20address%20for%20directions%2Fmap.)

(541) 506-6000 (tel:5415066000)

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION				
Department:	Aviation Maintenance Technology		Submitter name: phone: email:	Tyson M Aldrich taldrich@cgcc.edu
License/Certification Title:	FAA Airframe Rating		Granting Institution(s)/Agency(s):	FAA
Course Equivalency:	Course Title(s):	AMT 191, 192, 193, 194A, 194B, 195, 261, 262, 263, 264, 281		
	Credits:	57 total		
Potential application to current awards:	Aviation Airframe certificate, Aviation Powerplant certificate, Aviation Maintenance Technology certificate, Aviation Maintenance Technology AAS			

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	**AMT 191 Aviation Maintenance: General 101** **Description:** Introduces aircraft cleaning, corrosion control, materials, and aircraft hardware. Covers the selection of appropriate cleaning chemicals and processes. Describes the identification, selection, and installation of aircraft hardware, fluid lines, and fittings. Examines the performance of aircraft processes such as heat treating and hardness testing. Prerequisites: MTH 65 or equivalent placement; placement into IRW 115 or WR 115. Audit available. **Outcomes/content:** **Outcome #1: Identify and select aircraft materials used in performing aircraft cleaning and corrosion control, fluid line maintenance, and non-destructive inspection of ferrous and non-ferrous materials.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1 • AM.I.G.K1 Aircraft cleaning procedures. • AM.I.G.K2 Corrosion theory and causation. • AM.I.G.K3 Types and effects of corrosion. • AM.I.G.K4 Corrosion-prone areas in aircraft. • AM.I.G.K5 Corrosion preventive maintenance procedures. • AM.I.G.K6 Corrosion identification and inspection. • AM.I.G.K7 Corrosion removal and treatment procedures. • AM.I.G.K8 Corrosion preventive compounds (CPC) (e.g., waxy sealants, thin-film dielectrics). • AM.I.G.K9 Selection of optimal CPC and frequency of treatment. • AM.I.G.K10 Use of high-pressure application equipment.

- AM.I.G.K11 Improper use of cleaners on aluminum or composite materials. AM.I.G.K12 Dissimilar metals causing accelerated corrosion and role of protective barriers to mitigate this risk.
- AM.I.G.K13 Conversion coatings.
- AM.I.G.K14 Materials used for protection of airframe structures.
- AM.I.G.K15 Primer materials.
- AM.I.G.K16 Topcoat materials.
- AM.I.G.K17 Surface preparation for a desired finishing material.
- AM.I.G.K18 Effects of ambient conditions on finishing materials.
- AM.I.G.K19 Effects of improper surface preparation on finishing materials. AM.I.G.K20 Regulatory requirements for replacing identification, registration markings, and placards.
- AM.I.G.K21 Inspection of aircraft finishes.
- AM.I.G.K22 Safety practices/precautions when using finishing materials (e.g., PPE, fire prevention).
- AM.I.G.K23 Finishing materials application techniques and practices.
- AM.I.G.K24 Control surface balance considerations after refinishing.

Outcome 2: Apply FAA acceptable methods, techniques, and practices during aircraft maintenance operations.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.I.K1 Privileges and limitations of a mechanic certificate.
- AM.I.I.K2 Recent experience requirements and how to re-establish once lost.
- AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations.
- AM.I.I.K4 Maintenance record entry for approval for return to service after inspection.
- AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
- AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and

supplemental type certificates.

- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
- AM.I.I.K19 Inoperative equipment.
- AM.I.I.K20 Discrepancy records or placards.
- AM.I.I.K21 Usable on (effectivity) codes in parts manuals.
- AM.I.I.K22 Methods used to establish the serial number effectivity of an item.
- AM.I.I.K23 Mechanic address change notification procedures

Outcome 3: Utilize appropriate non-destructive testing methods commonly employed in the aircraft industry.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.K.K3 Nondestructive Testing (NDT) procedures and methods.
- AM.I.K.K4 Aircraft inspection programs (e.g., progressive, 100-hour, annual, and other FAA-approved inspections).
- AM.I.K.K5 Aircraft inspection methods and tools for materials, hardware, and processes.

Outcome 4: Apply math and physics principles in solving problems associated with aviation maintenance.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 4

- AM.I.H.K1 Areas of various geometrical shapes.
- AM.I.H.K2 Volumes of various geometrical shapes.
- AM.I.H.K3 Definitions, descriptions and use of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse.
- AM.I.H.K4 Ratio problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
- AM.I.H.K5 Proportion and percentage problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
- AM.I.H.K6 Algebraic operations, including examples of where or how they may be used in relation to aircraft maintenance.

- AM.I.H.K7 Conditions or areas in which metric conversion may be necessary.
- AM.I.H.K8 Scientific (exponential) notation, decimal notation, fractional notation, binary notation, and conversion between these various forms of numeric notation.
- AM.I.H.K9 Rounding numbers.
- AM.I.H.K10 Powers and special powers.
- AM.I.H.K11 Measurement systems.
- AM.I.H.K12 Use of positive and negative integers in mathematical operations.
- AM.I.H.K13 Basic mathematic functions (addition, subtraction, multiplication, division).

AMT 192 Aviation Maintenance: General 102

Description: Examines the government's involvement in aviation maintenance, and FAA regulations regarding aviation maintenance and approved training programs. Emphasizes the use of maintenance publications, maintenance forms and records, and technicians' privileges and limitations. Addresses aircraft weight and balance procedures and associated record keeping, aircraft drawings and ground operations and servicing. Prerequisite: AMT 191. Audit available.

Outcomes/content:

Outcome 1: Use aircraft drawings and other graphic information in performing aircraft maintenance and alterations.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.I.B.K1 Drawings, blueprints, sketches, charts, graphs, and system schematics, including commonly used lines, symbols, and terminology.
- AM.I.B.K2 Repair or alteration of an aircraft system or component(s) using drawings, blueprints, or system schematics to determine whether it conforms to its type design.
- AM.I.B.K3 Inspection of an aircraft system or component(s) using drawings, blueprints, or system schematics.
- AM.I.B.K4 Terms used in conjunction with aircraft drawings, blueprints, or system schematics.

Outcome 2: Perform a complete aircraft weight and balance procedure, including preparation of required documentation and records.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.C.K1 Weight and balance terminology.
- AM.I.C.K2 Purpose for weighing an aircraft.
- AM.I.C.K3 Weighing procedures, including the general preparations for weighing, with emphasis on aircraft weighing area considerations.
- AM.I.C.K4 Procedures for calculation of the following: arm, positive or negative moment, center of gravity (CG), or moment index.
- AM.I.C.K5 Purpose and application of weight and CG limits.

- AM.I.C.K6 Purpose of determining CG.
- AM.I.C.K7 Adverse loading considerations and how to calculate if adverse loading causes an out-of-limit condition.
- AM.I.C.K8 Determine proper empty weight configuration. AM.I.C.K9 Proper ballast placement.
- AM.I.C.K10 Jacking an aircraft.

Outcome 3: Identify typical ground operation hazards when moving, securing and servicing aircraft.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.F.K1 Aircraft towing procedures.
- AM.I.F.K2 Aircraft securing procedures.
- AM.I.F.K3 Aviation fueling/defueling procedures.
- AM.I.F.K4 Airport operation area procedures and ATC communications, including runway incursion prevention.
- AM.I.F.K5 Engine starting, ground operation, and aircraft taxiing procedures.

Outcome 4: Demonstrate ability to read, comprehend and apply information contained in FAA and manufacturer's aircraft specifications and other airworthiness directives and advisory materials.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 4

- AM.I.I.K1 Privileges and limitations of a mechanic certificate.
- AM.I.I.K2 Recent experience requirements and how to re-establish once lost. AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations.
- AM.I.I.K4 Maintenance record entry for approval for return to service after inspection.
- AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
- AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.

- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
- AM.I.I.K19 Inoperative equipment.
- AM.I.I.K20 Discrepancy records or placards.
- AM.I.I.K21 Usable on (effectivity) codes in parts manuals.
- AM.I.I.K22 Methods used to establish the serial number effectivity of an item.

Outcome 5: Identify and implement aircraft requirements for safe starting, ground operation and movement, servicing and securing.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 5

- AM.I.F.K1 Aircraft towing procedures.
- AM.I.F.K2 Aircraft securing procedures.
- AM.I.F.K3 Aviation fueling/defueling procedures.
- AM.I.F.K4 Airport operation area procedures and ATC communications, including runway incursion prevention.
- AM.I.F.K5 Engine starting, ground operation, and aircraft taxiing procedures
- AM.I.F.K8 Oxygen system servicing procedures.
- AM.I.F.K9 Characteristics of aviation gasoline and turbine fuels, including basic types and means of identification.
- AM.I.F.K10 Fuel additives commonly used in the field.
- AM.I.F.K11 Use of approved grades/types of fuel in aircraft engines.
- AM.I.F.K12 Tool and hardware use and accountability.
- AM.I.F.K13 Material handling.
- AM.I.F.K14 Parts protections.
- AM.I.F.K15 Hazardous materials, Safety Data Sheets (SDS), and PPE. AM.I.F.K16 Foreign object damage effects.

AMT 193 Aviation Maintenance: General 103

Description: Examines the theory and application of basic DC and AC electrical concepts, definitions, and laws. Introduces passive electrical components, electrical sources, schematic symbols, and electrical wiring diagrams. Explains the methods of safe and accurate measurement of DC and AC electrical quantities using basic electrical test equipment. Provides troubleshooting defective components, observing the characteristics of electrical components in test circuits, and wiring circuits from

schematic diagrams. Prerequisites: AMT 192. Audit available.

Outcomes/content:

Outcome 1: Apply electrical theory to aircraft systems and components.

Outcome 2: Identify and apply the factors affecting voltage, resistance and current to aircraft electrical circuits.

Outcome 3: Measure and calculate electrical power.

Outcome 4: Identify electrical components and interpret wiring diagrams.

Outcome 5: Demonstrate electrical testing and monitoring instruments for aircraft electrical circuits.

Outcome 6: Calculate and measure capacitance and inductance.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1-6

- AM.I.A.K1 Electron theory (conventional flow vs. electron flow).
- AM.I.A.K2 Magnetism.
- AM.I.A.K3 Capacitance in a circuit.
- AM.I.A.K4 Inductance in a circuit.
- AM.I.A.K5 Alternating current (AC) electrical circuits.
- AM.I.A.K6 Direct current (DC) electrical circuits.
- AM.I.A.K7 Electrical laws and theory.
- AM.I.A.K7a a. Ohm's Law
- AM.I.A.K7b b. Kirchhoff's Laws
- AM.I.A.K7c c. Watt's Law
- AM.I.A.K7d d. Faraday's Law
- AM.I.A.K7e e. Lenz's Law
- AM.I.A.K7f f. Right-hand motor rule
- AM.I.A.K8 Electrical measurement tools, principles, and procedures.
- AM.I.A.K9 Voltage.
- AM.I.A.K9a a. Regulation
- AM.I.A.K10 Current.
- AM.I.A.K11 Resistance.
- AM.I.A.K11a a. Impedance
- AM.I.A.K11b b. Resistance in series
- AM.I.A.K11c c. Resistance in parallel
- AM.I.A.K11d d. Total resistance
- AM.I.A.K12 Power.
- AM.I.A.K13 Series circuits.
- AM.I.A.K14 Parallel circuits.
- AM.I.A.K15 Aircraft batteries.
- AM.I.A.K16 Transformers.
- AM.I.A.K17 Circuit continuity.
- AM.I.A.K18 Controlling devices, including switches and relays.
- AM.I.A.K19 Protective devices, including fuses, circuit breakers, and

current limiters.

- AM.I.A.K20 Resistor types and color coding.
- AM.I.A.K21 Semiconductors, including diodes, transistors, and integrated circuits.

AMT 194A Aviation Maintenance: General 104A

Description: Explores airframe electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the application of electrical principles used in sensing, indicating and control of airframe systems. Prerequisites: AMT 193. Audit available.

Outcomes/content:

Outcome 1: Repair and inspect aircraft electrical system components.

Outcome 2: Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1-2

- AM.I.A.S1 Perform circuit continuity test.
- AM.I.A.S2 Measure voltage.
- AM.I.A.S3 Measure current.
- AM.I.A.S4 Measure resistance.
- AM.I.A.S5 Test a switch or relay.
- AM.I.A.S6 Test a fuse or circuit breaker.
- AM.I.A.S7 Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
- AM.I.A.S8 Troubleshoot a circuit.
- AM.I.A.S9 Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
- AM.I.A.S10 Demonstrate how to test for short-circuit and open-circuit conditions.
- AM.I.A.S11 Measure voltage drop across a resistor.
- AM.I.A.S12 Determine or measure for open electrical circuits.
- AM.I.A.S13 Inspect an aircraft battery.
- AM.I.A.S14 Service an aircraft battery.

Outcome 3: Read and interpret aircraft circuit diagrams.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.A.K25 Electrical circuit drawings

AMT 194B Aviation Maintenance: General 104B

Description: Explores engine electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the application of electrical principles used in sensing, indicating and control of powerplant systems. Prerequisite/concurrent: AMT 194A. Audit available.

Outcomes/content:

Outcome 1: inspect, check, and troubleshoot constant speed and integrated speed drive generators.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.I.A.K25 Electrical circuit drawings.
- AM.I.A.K26 Complex/combined circuits.
- AM.I.A.K27 AC and DC motors.
- AM.III.F.K1 Generators.
- AM.III.F.K2 Alternators.
- AM.III.F.K3 Starter generators.
- AM.III.F.K4 Voltage regulators and overvoltage and overcurrent protection. AM.III.F.K5 DC generation systems.
- AM.III.F.K6 AC generation systems.

Outcome 2: Repair engine electrical system components.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.III.F.S1 Inspect engine electrical wiring, switches, and protective devices.
- AM.III.F.S2 Determine suitability of a replacement component by part number.
- AM.III.F.S3 Replace an engine-driven generator or alternator.
- AM.III.F.S4 Inspect an engine-driven generator or alternator in accordance with manufacturer's instructions.
- AM.III.F.S5 Troubleshoot an aircraft electrical generating system.
- AM.III.F.S6 Remove and install an engine direct-drive electric starter.
- AM.III.F.S7 Troubleshoot a direct-drive electric starter system.

Outcome 3: Install and service engine electrical wiring, controls, switches, indicators and protective devices.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.A.S1 Perform circuit continuity test.
- AM.I.A.S2 Measure voltage.
- AM.I.A.S3 Measure current.
- AM.I.A.S4 Measure resistance.
- AM.I.A.S5 Test a switch or relay.
- AM.I.A.S6 Test a fuse or circuit breaker.
- AM.I.A.S7 Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
- AM.I.A.S8 Troubleshoot a circuit.
- AM.I.A.S9 Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit

breakers, batteries, diodes, transistors, and integrated circuits).

- AM.I.A.S10 Demonstrate how to test for short-circuit and open-circuit conditions.
- AM.I.A.S11 Measure voltage drop across a resistor.
- AM.I.A.S12 Determine or measure for open electrical circuits.
- AM.I.A.S13 Inspect an aircraft battery.
- AM.I.A.S14 Service an aircraft battery.

AMT 195 Aviation Maintenance: General 105

Description: Examines the use of mechanical and electronic systems in sensing, communicating, and displaying information. Explores solid state and digital devices, sensors, and special circuits used in aircraft instrumentation systems, fuel systems and fire protection systems. Analyzes the methods used in testing, inspecting, and troubleshooting those systems. Prerequisites: AMT 194 or (AMT 194A and AMT 194B). Audit available.

Outcomes/content:

Outcome 1: Apply the principles of operation and system troubleshooting methods for aircraft and engine instruments.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.III.D.K1 Fuel flow.
- AM.III.D.K2 Temperature (e.g., exhaust gas, oil, oil cylinder head, turbine inlet).
- AM.III.D.K3 Engine speed indicating systems.
- AM.III.D.K4 Pressure (e.g., air, fuel, manifold, oil).
- AM.III.D.K5 Annunciator indicating systems (e.g., warning, caution, and advisory lights).
- AM.III.D.K6 Torquemeters.
- AM.III.D.K7 Engine pressure ratio (EPR).
- AM.III.D.K8 Engine indicating and crew alerting system (EICAS).
- AM.III.D.K9 Digital engine control module (e.g., full authority digital engine controls (FADEC)).
- AM.III.D.K10 Electronic centralized aircraft monitor (ECAM).
- AM.III.D.K11 Engine instrument range markings and instrument conditions.

Outcome2: Apply electrical schematics to troubleshoot and repair aircraft fire protection systems.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.B.R3 Applicability of the drawing or schematic to the particular aircraft by model and serial number.

Outcome 3: Perform airframe and engine conformity inspections.

Outcome 4: Identify, troubleshoot and repair aircraft and engine fuel systems.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3 & 4

- AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations.
- AM.I.I.K4 Maintenance record entry for approval for return to service after inspection.
- AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
- AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.
- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
- AM.I.I.K19 Inoperative equipment.
- AM.I.I.K20 Discrepancy records or placards.
- AM.I.I.K21 Usable on (effectivity) codes in parts manuals.
- AM.I.I.K22 Methods used to establish the serial number effectivity of an item.

AMT 261 Aviation Maintenance: Airframe 1

Description: Details ice and rain control systems and associated warning systems. Examines the fundamentals of installation, operation and maintenance of airborne communication and navigation instruments, and auto flight systems. Introduces methods of assembly and rigging commonly used in preparing aircraft for a safe test

flight. Provides welding fundamentals in relation to aircraft repair. Prerequisites: AMT 195. Audit available.

Outcomes/content:

Outcome 1: Demonstrate knowledge of aerodynamics and its relationship to aircraft assembly and rigging.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 1

- AM.II.C.K1 Control cables.
- AM.II.C.K2 Control cable maintenance.
- AM.II.C.K3 Cable connectors.
- AM.II.C.K4 Cable guides.
- AM.II.C.K5 Control stops.
- AM.II.C.K6 Push-pull tubes.
- AM.II.C.K7 Torque tubes.
- AM.II.C.K8 Bellcranks.
- AM.II.C.K9 Flutter and flight control balance.
- AM.II.C.K10 Rigging of aircraft flight controls.
- AM.II.C.K11 Aircraft flight controls and stabilizer systems.
- AM.II.C.K12 Other aerodynamic wing features.
- AM.II.C.K13 Secondary and auxiliary control surfaces.
- AM.II.C.R2 Rigging aircraft flight controls.

Outcome 2: Assemble, rig, and inspect aircraft using proper procedures and techniques.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 2

- AM.II.C.S1 Identify fixed-wing aircraft rigging adjustment locations.
- AM.II.C.S2 Identify control surfaces that provide movement about an aircraft's axes.
- AM.II.C.S3 Inspect a primary and secondary flight control surface.
- AM.II.C.S4 Remove and reinstall a primary flight control surface.
- AM.II.C.S5 Inspect primary control cables.
- AM.II.C.S6 Adjust and secure a primary flight control cable.
- AM.II.C.S7 Adjust push-pull flight control systems.
- AM.II.C.S8 Check the balance of a flight control surface.
- AM.II.C.S9 Determine allowable axial play limits for a flight control bearing. AM.II.C.S10 Inspect a trim tab for freeplay, travel, and operation.
- AM.II.C.S11 Balance a control surface.
- AM.II.C.S12 Fabricate a primary flight control cable.

Outcome 3: Apply the principles of operation and maintenance procedures to communication, navigation, and inter-graded flight control systems.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with

	outcome 3 • AM.II.I.K1 Radio operating principles. • AM.II.I.K2 Radio components. • AM.II.I.K3 Antenna, static discharge wicks, and avionics identification, inspection, and mounting requirements. • AM.II.I.K4 Interphone and intercom systems. • AM.II.I.K5 Very high frequency (VHF), high frequency (HF), and SATCOM systems. • AM.II.I.K6 Aircraft Communication Addressing and Reporting System (ACARS) theory, components, and operation. • AM.II.I.K7 Emergency locator transmitter (ELT). • AM.II.I.K8 Automatic direction finder (ADF). • AM.II.I.K9 VHF omnidirectional range (VOR) theory, components, and operation. AM.II.I.K10 Distance measuring equipment (DME) theory, components, and operation. • AM.II.I.K11 Instrument landing system (ILS) theory, components, and operation. • AM.II.I.K12 Global positioning system (GPS) theory, components, and operation. • AM.II.I.K13 Traffic collision avoidance system (TCAS), theory, components, and operation. • AM.II.I.K14 Weather radar. • AM.II.I.K15 Ground proximity warning system (GPWS) theory, components, and operation. • AM.II.I.K16 Autopilot theory, components, and operation. • AM.II.I.K17 Auto-throttle theory, components, and operation. • AM.II.I.K18 Stability augmentation systems (SAS) (Rotorcraft). • AM.II.I.K19 Radio altimeter (RA) theory, components, and operation. • AM.II.I.K20 Automatic Dependent Surveillance-Broadcast (ADS-B) theory, components, and operation. • AM.II.I.K21 Transponder/encoder system **Outcome 4: Demonstrate basic welding techniques.** **Outcome 5: Service and repair ice and rain control system.** ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 4 and 5 • AM.II.L.K1 Aircraft icing causes/effects. • AM.II.L.K2 Ice detection systems. • AM.II.L.K3 Aircraft and powerplant anti-ice systems and components. • AM.II.L.K4 De-ice systems and components. • AM.II.L.K5 Wiper blade, chemical, and pneumatic bleed air rain control systems. • AM.II.L.K6 Anti-icing and de-icing system maintenance. • AM.II.L.K7 Environmental conditions that degrade vision.

- AM.II.L.R1 System testing or maintenance.
- AM.II.L.R2 Storage and handling of deicing fluids.
- AM.II.L.R3 Selection and use of cleaning materials for heated windshields.
- AM.II.L.S1 Inspect and operationally check pitot-static anti-ice system.
- AM.II.L.S2 Inspect and operationally check deicer boot.
- AM.II.L.S3 Clean a pneumatic deicer boot.
- AM.II.L.S4 Troubleshoot an electrically-heated pitot system.
- AM.II.L.S5 Inspect thermal anti-ice systems.
- AM.II.L.S6 Inspect and operationally check an electrically-heated windshield.
- AM.II.L.S7 Locate and explain the procedures for inspecting an electrically-operated windshield wiper system.
- AM.II.L.S8 Locate and explain the procedures for replacing blades on a windshield wiper system.
- AM.II.L.S9 Locate and explain the procedures for inspecting a pneumatic rain removal system.
- AM.II.A.K10 Flame welding gases.
- AM.II.A.K11 Storage/handling of welding gases.
- AM.II.A.K12 Flame welding practices and techniques.
- AM.II.A.K13 Inert-gas welding practices and techniques.
- AM.II.A.K14 Purpose and types of shielding gases.
- AM.II.A.K15 Types of steel tubing welding repairs.
- AM.II.A.K16 Procedures for weld repairs.
- AM.II.A.K17 Types of structures and their characteristics.

AMT 262 Aviation Maintenance: Airframe 2

Description: Examines the inspection and repair of aircraft landing gear and hydraulic and pneumatic system components. Introduces various airframe systems, specifically position and warning systems. Prerequisites: AMT 261. Audit available.

Outcomes/content:

Outcome 1: Inspect and safely perform maintenance and repair of aircraft landing gear, hydraulic and pneumatic systems and their components, in accordance with the manufacturer's service manuals, acceptable industry practices, and applicable regulations.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 1

- AM.II.E.K1 Fixed and retractable landing gear systems.
- AM.II.E.K2 Fixed and retractable landing gear components.
- AM.II.E.K3 Landing gear strut servicing/lubrication.
- AM.II.E.K4 Inspection of bungee and spring steel landing gear systems.
- AM.II.E.K5 Steering systems.
- AM.II.E.K6 Landing gear position and warning system inspection, check, and

	servicing. • AM.II.E.K7 Brake assembly servicing and inspection. • AM.II.E.K8 Anti-skid system components and operation. • AM.II.E.K9 Wheel, brake, and tire construction. • AM.II.E.K10 Tire storage, care, and servicing. • AM.II.E.K11 Landing gear and tire and wheel safety and inspection. • AM.II.E.K12 Brake actuating systems. • AM.II.E.K13 Alternative landing gear systems (e.g., skis, floats). • AM.II.E.S1 Inspect and service landing gear. • AM.II.E.S2 Inspect, check, and service an anti-skid system. • AM.II.E.S3 Locate and explain procedures for checking operation of an anti-skid warning system. • AM.II.E.S4 Locate and explain troubleshooting procedures for an anti-skid system. • AM.II.E.S5 Jack aircraft. • AM.II.E.S6 Troubleshoot a landing gear retraction check. • AM.II.E.S7 Inspect wheels, brakes, bearings, and tires. • AM.II.E.S8 Remove and replace brake lining(s). • AM.II.E.S9 Service landing gear air/oil shock strut. • AM.II.E.S10 Bleed air from a hydraulic brake system. • AM.II.E.S11 Troubleshoot hydraulic brake systems. • AM.II.E.S12 Remove, inspect, and install a wheel brake assembly. • AM.II.F.K1 Hydraulic system components and fluids. • AM.II.F.K2 Hydraulic system operation. • AM.II.F.K3 Hydraulic system servicing requirements. • AM.II.F.K4 Hydraulic system inspection, check, servicing, and troubleshooting. • AM.II.F.K5 Pneumatic system types and components. • AM.II.F.K6 Pneumatic system servicing requirements. • AM.II.F.K7 Servicing, function, and operation of accumulators. • AM.II.F.K8 Types of hydraulic/pneumatic seals and fluid/seal compatibility. • AM.II.F.K9 Hoses, lines, and fittings. • AM.II.F.K10 Pressure regulators, restrictors, and valves. • AM.II.F.K11 Filter maintenance procedures. • AM.II.F.S1 Identify different types of hydraulic fluids. • AM.II.F.S2 Identify different packing seals. • AM.II.F.S3 Install seals and backup rings in a hydraulic component. • AM.II.F.S4 Remove and install a selector valve. • AM.II.F.S5 Check a pressure regulator and adjust as necessary. • AM.II.F.S6 Remove, clean, inspect, and install a hydraulic system filter. • AM.II.F.S7 Service a hydraulic system accumulator.

	• AM.II.F.S8 Service a hydraulic system reservoir. • AM.II.F.S9 Remove, install, and perform an operational check of a hydraulic pump. • AM.II.F.S10 Locate procedures for checking pneumatic/bleed air overheat warning systems. • AM.II.F.S11 Purge air from a hydraulic system. • AM.II.F.S12 Remove and install a system pressure relief valve. • AM.II.F.S13 Inspect a hydraulic or pneumatic system for leaks. • AM.II.F.S14 Troubleshoot a hydraulic or pneumatic system for leaks. **Outcome 2: Identify and apply basic theory and computation skills regarding hydraulic and pneumatic power as they relate to landing gear and various aircraft structure mechanical advantage devices.** ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 2 • AM.II.F.S1 Identify different types of hydraulic fluids. • AM.II.F.S2 Identify different packing seals. • AM.II.F.S3 Install seals and backup rings in a hydraulic component. • AM.II.F.S4 Remove and install a selector valve. • AM.II.F.S5 Check a pressure regulator and adjust as necessary. • AM.II.F.S6 Remove, clean, inspect, and install a hydraulic system filter. • AM.II.F.S7 Service a hydraulic system accumulator. • AM.II.F.S8 Service a hydraulic system reservoir. • AM.II.F.S9 Remove, install, and perform an operational check of a hydraulic pump. • AM.II.F.S10 Locate procedures for checking pneumatic/bleed air overheat warning systems. • AM.II.F.S11 Purge air from a hydraulic system. • AM.II.F.S12 Remove and install a system pressure relief valve. • AM.II.F.S13 Inspect a hydraulic or pneumatic system for leaks. • AM.II.F.S14 Troubleshoot a hydraulic or pneumatic system for leaks. • AM.I.J.K2 Work, power, force, and motion. • AM.I.J.K3 Simple machines and mechanics. **Outcome 3: Identify and apply the principles of function and safe operation of landing gear, hydraulic and pneumatic systems and position and warning systems.** ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 3 • AM.II.E.K6 Landing gear position and warning system inspection, check, and servicing. • AM.II.E.K8 Anti-skid system components and operation. • AM.II.E.K11 Landing gear and tire and wheel safety and inspection. • AM.II.E.K12 Brake actuating systems.

Outcome 4: Inspect and service or repair speed and configuration warning systems, electrical brake controls and antiskid systems.

- ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 4
  AM.II.E.S2 Inspect, check, and service an anti-skid system.
- AM.II.E.S3 Locate and explain procedures for checking operation of an anti-skid warning system.
- AM.II.E.S4 Locate and explain troubleshooting procedures for an anti-skid system.

AMT 263 Aviation Maintenance: Airframe 3

Description: Introduces sheet metal, its properties, and uses in fabrication of structural and nonstructural components of aerospace vehicles. Addresses inspection techniques along with fabrication and repair processes for bending, cutting, forming, drilling, and riveting aluminum sheet metal parts. Prerequisites: AMT 262. Audit available.

Outcomes/content:

Outcome 1: Apply computation skills and interpret drawings and instructions for the preparation of aircraft structural repairs and alterations.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 1

- AM.II.D.K1 Inspection requirements under 14 CFR part 91.
- AM.II.D.K2 Maintenance recordkeeping requirements under 14 CFR part 43.
- AM.II.D.K3 Requirements for complying with ADs.
- AM.II.D.K4 Identification of life-limited parts and their replacement interval.
- AM.II.D.K5 Special inspections.
- AM.II.D.K6 Use of FAA-approved data.
- AM.II.D.K7 Compliance with service letters, service bulletins, instructions for continued airworthiness, or ADs.
- AM.II.D.K8 CFRs applicable to inspection and airworthiness.
- AM.II.D.R2 Visual inspection and where to apply it.
- AM.II.D.R3 Performing radiographic inspections.
- AM.II.D.R4 Selection and use of checklists and other maintenance publications.
- AM.II.D.R5 Maintenance record documentation.

Outcome 2: Identify and use appropriate aircraft sheet metal hand and shop tools during the preparation and fabrication of aircraft structural repair parts.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 2

- AM.II.A.K1 Inspection/testing of metal structures.
- AM.II.A.K2 Types of sheet metal defects.

	• AM.II.A.K3 Selection of sheet metal repair materials. • AM.II.A.K4 Layout, forming, and drilling of sheet metal components. • AM.II.A.K5 Selection of rivets, hardware, and fasteners for a sheet metal repair. • AM.II.A.K6 Heat treatment processes for aluminum. • AM.II.A.K7 Rivet layout. • AM.II.A.K8 Rivet removal and installation methods. • AM.II.A.K9 Maintenance safety practices/precautions for sheet metal repairs or fabrications. **Outcome 3: Select and install various sizes of conventional rivets and special fasteners using proper preparation and technique.** ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 3 • AM.II.A.S1 Install and remove solid rivets. • AM.II.A.S2 Install and remove a blind rivet. • AM.II.A.S3 Determine applicability of sheet metal for a repair in a specific application. • AM.II.A.S4 Select and install special purpose fasteners. • AM.II.A.S5 Design a repair using a manufacturer's structural repair manual. • AM.II.A.S6 Prepare and install a patch to repair an aircraft or component. • AM.II.A.S7 Make a drawing of a repair, including the number of rivets and size of sheet metal required. • AM.II.A.S8 Remove a repair that was installed with rivets. **Outcome 4: Identify and apply acceptable methods, techniques and practices during the assembly and repair of aircraft sheet metal structures** ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 4 • AM.II.A.S13 Perform a repair on a damaged aluminum sheet. • AM.II.A.S14 Determine extent of damage and decide if metallic structure is repairable • AM.II.A.K1 Inspection/testing of metal structures. • AM.II.A.K2 Types of sheet metal defects. • AM.II.A.K3 Selection of sheet metal repair materials. • AM.II.A.K4 Layout, forming, and drilling of sheet metal components. • AM.II.A.K5 Selection of rivets, hardware, and fasteners for a sheet metal repair. • AM.II.A.K6 Heat treatment processes for aluminum. • AM.II.A.K7 Rivet layout. • AM.II.A.K8 Rivet removal and installation methods. • AM.II.A.K9 Maintenance safety practices/precautions for sheet metal repairs or fabrications.

AMT 264 Aviation Maintenance: Airframe 4

Description: Examines the theory and techniques used in the fabrication, inspection, repair, and finishing of bonded structures, plastics, wood structures, fabric covering, honeycomb structures, and advanced composite structures. Details the environmental control systems (head, air conditioning, pressurization, oxygen). Prerequisites: AMT 263. Audit available.

Outcomes/content:

Outcome 1: Fabricate, and perform repairs to wood and plastic components and composite structures.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 1

- AM.II.B.S1 Identify appropriate fasteners on composite structures.
- AM.II.B.S2 Inspect and repair fiberglass.
- AM.II.B.S3 Inspect composite, plastic, or glass-laminated structures.
- AM.II.B.S4 Clean and inspect acrylic type windshields.
- AM.II.B.S5 Locate and explain procedures for a temporary repair to a side window.
- AM.II.B.S6 Locate and explain the procedures for tying a modified seine knot.
- AM.II.B.S7 Prepare composite surface for painting.
- AM.II.B.S8 Perform a tap test on composite material.
- AM.II.B.S9 Locate and explain repair standard dimensions.
- AM.II.B.S10 Locate and explain repair procedures for elongated bolt holes.
- AM.II.B.S11 Determine extent of damage and decide if nonmetallic structure is repairable.
- AM.II.B.S12 Perform lay up for a repair to a composite panel, including preparation for vacuum bagging, using a manufacturer's repair manual.

Outcome 2: Determine the criteria for selecting special fastener systems used in composite structures.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 2

- AM.II.B.K19 Types of composite structure defects.
- AM.II.B.K20 Composite structure fiber, core, and matrix materials.
- AM.II.B.K21 Composite materials storage practices and shelf life.
- AM.II.B.K22 Composite repair methods, techniques, fasteners, and practices.
- AM.II.B.K23 Thermoplastic material inspection/types of defects.
- AM.II.B.K27 Window temporary and permanent repairs.
- AM.II.B.K28 Maintenance safety practices/precautions for composite materials/structures, and windows.

Outcome 3: Identify approved aircraft fabric covering processes, materials, and inspection procedures.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 3

- AM.II.B.K1 Wood structures, including inspection techniques, tools, and practices for wood structures.
- AM.II.B.K2 Effects of moisture/humidity on wood and fabric coverings.
- AM.II.B.K3 Types and general characteristics of wood used in aircraft structures.
- AM.II.B.K4 Permissible substitutes and other materials used in the construction and repair of wood structures.
- AM.II.B.K5 Acceptable and unacceptable wood defects.
- AM.II.B.K6 Wood repair techniques and practices.
- AM.II.B.K7 Factors used in determining the proper type covering material.
- AM.II.B.K8 Types of approved aircraft covering material.
- AM.II.B.K9 Seams commonly used with aircraft covering.
- AM.II.B.K10 Covering textile terms.
- AM.II.B.K11 Structure surface preparation.
- AM.II.B.K12 Covering methods commonly used.
- AM.II.B.K13 Covering means of attachment.
- AM.II.B.K14 Areas on aircraft covering most susceptible to deterioration.
- AM.II.B.K15 Aircraft covering preservation/restoration.
- AM.II.B.K16 Inspection of aircraft covering.
- AM.II.B.K17 Covering repair techniques and practices.

Outcome 4: Select and apply aircraft finishing materials.

Outcome 5: Inspect, troubleshoot and repair cabin atmosphere control systems.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 4 and 5

- AM.I.G.S8 Prepare composite surface for painting.
- AM.I.G.S9 Identify finishing materials and appropriate thinners.
- AM.I.G.S10 Layout and mask a surface in preparation for painting.
- AM.I.G.S11 Prepare metal surface for painting.
- AM.I.G.S12 Determine what paint system can be used on a given aircraft.
- AM.I.G.S13 Apply etch solution and conversion coating.
- AM.I.G.S14 Identify types of protective finishes.
- AM.II.G.K1 Pressurization systems.
- AM.II.G.K2 Bleed air heating.
- AM.II.G.K3 Aircraft instrument cooling.
- AM.II.G.K4 Exhaust heat exchanger and system component(s) function,

operation, and inspection procedures.

- AM.II.G.K5 Combustion heater and system component(s) function, operation, and inspection procedures.
- AM.II.G.K6 Vapor-cycle system and system component(s) operation, servicing, and inspection procedures.
- AM.II.G.K7 Air-cycle system and system component(s) operation and inspection procedures.
- AM.II.G.K8 Cabin pressurization and system component(s) operation and inspection procedures.
- AM.II.G.K9 Types of oxygen systems and oxygen system component(s) operation (e.g., chemical generator,
- pressure cylinder).
- AM.II.G.K10 Oxygen system maintenance and inspection procedures.
- AM.II.G.S1 Inspect an oxygen system.
- AM.II.G.S2 Purge an oxygen system prior to servicing.
- AM.II.G.S3 Service an oxygen system.
- AM.II.G.S4 Clean and inspect a pilot emergency oxygen mask and supply hoses.
- AM.II.G.S5 Inspect an oxygen system pressure regulator.
- AM.II.G.S6 Inspect an oxygen system cylinder for serviceability.
- AM.II.G.S7 Inspect a chemical oxygen generator for serviceability and safe handling.
- AM.II.G.S8 Locate the procedures to troubleshoot a combustion heater.
- AM.II.G.S9 Locate the procedures for servicing a refrigerant (vapor-cycle) system.
- AM.II.G.S10 Inspect a combustion heater fuel system for leaks.
- AM.II.G.S11 Locate the troubleshooting procedures for an air-cycle system.
- AM.II.G.S12 Troubleshoot an air-cycle air conditioning system.
- AM.II.G.S13 Inspect a cabin heater system equipped with an exhaust heat exchanger for cracks.
- AM.II.G.S14 Clean and inspect an outflow valve for a pressurization system.

AMT 281 Aviation Maintenance: Airframe Return to Service

Description: Provides diversified projects, supervised field experiences and FAA examination review for Airframe production. Prerequisite: AMT 264. Audit available.

Outcomes/content:

Outcome 1: Read, comprehend and apply FAA and manufacturer's aircraft maintenance specifications and data sheets.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 1

- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.

- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.
- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.

Outcome 2: Balance, rig and inspect flight control surfaces.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 2

- AM.II.C.K1 Control cables.
- AM.II.C.K2 Control cable maintenance.
- AM.II.C.K3 Cable connectors.
- AM.II.C.K4 Cable guides.
- AM.II.C.K5 Control stops.
- AM.II.C.K6 Push-pull tubes.
- AM.II.C.K7 Torque tubes.
- AM.II.C.K8 Bellcranks.
- AM.II.C.K9 Flutter and flight control balance.
- AM.II.C.K10 Rigging of aircraft flight controls.
- AM.II.C.K11 Aircraft flight controls and stabilizer systems.
- AM.II.C.K12 Other aerodynamic wing features.
- AM.II.C.K13 Secondary and auxiliary control surfaces.

Outcome 3: Utilize the skills that are expected of those entering the aviation maintenance industry as a certified Aircraft Mechanic with an airframe rating.

ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 3

	• AM.I.I.S1 Complete an FAA Form 337 for a major repair or alteration. • AM.I.I.S2 Examine an FAA Form 337 for accuracy. • AM.I.I.S3 Determine an aircraft's inspection status by reviewing the aircraft's maintenance records. • AM.I.I.S4 Complete an aircraft maintenance record entry for the compliance of a reoccurring AD for a specific airframe, aircraft engine, appliance, or propeller. • AM.I.I.S5 Compare an equipment list for an aircraft to equipment installed. • AM.I.I.S6 Locate applicable FAA aircraft specifications and FAA TCDS for an aircraft or component. • AM.I.I.S7 Complete an aircraft maintenance record entry for return to service. • AM.I.I.S8 Determine applicability of an AD. • AM.I.I.S9 Check a Technical Standard Order (TSO) or part manufacturing authorization for the proper markings. • AM.I.I.S10 Use a manufacturer's illustrated parts catalog to locate a specific part number and applicability. • AM.I.I.S11 Locate supplemental type certificates applicable to a specific aircraft. • AM.I.I.S12 Determine the conformity of aircraft instrument range markings and placarding. • AM.I.I.S13 Determine approved replacement parts for installation on a given aircraft. • AM.I.I.S14 Determine maximum allowable weight of a specific aircraft. • AM.I.I.S15 Determine whether a given repair or alteration is major or minor. • AM.I.I.S16 Determine applicability of approved data for a major repair. • AM.I.I.S17 Explain the difference between "approved data" (required for major repair/alteration) and "acceptable data" (required for minor repair/alteration). • AM.I.I.S18 Complete a 100-hour inspection aircraft maintenance record entry. **Outcome 4: Make independent and accurate airworthiness judgments appropriate to Airframe Subject Area content.** ACS knowledge codes tested during FAA Airframe Written, and Alignment with outcome 4 • AM.II.D.S1 Perform an airframe inspection, including a records check. • AM.II.D.S2 Perform a portion of a 100-hour inspection in accordance with 14 CFR part 43. • AM.II.D.S3 Enter results of a 100-hour inspection in a maintenance record. • AM.II.D.S4 Determine compliance with a specific AD. • AM.II.D.S5 Provide a checklist for conducting a 100-hour inspection. • AM.II.D.S6 Determine if any additional inspections are required during a particular 100-hour inspection; (i.e., 300-hour filter replacement). • AM.II.D.S7 Inspect seat and seatbelt, including TSO markings.

Other:	Students must have passed the FAA Airframe Written Test, and Passed the Airframe Oral and Practical Test. The student will possess an FAA Airframe Rating. Since the FAA General Section of the AMT course is not a stand-alone rating, it is tested concurrently with the Airframe section of the AMT rating or during the first FAA Oral and Practical test the student completes. Therefore, a student entering with a FAA Airframe rating will also be awarded credit for the General Section of the AMT program.

SECTION #3 IMPLEMENTATION	
Implementation term:	☒ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW

"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."

Submitter	Email	Date
Tyson M Aldrich	Taldrich@cgcc.edu	05/01/2024
Department Chair (enter name of department chair): James Pytel		
Department Dean/Director (enter name of department dean/director): Robert Wells-Clark		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
2. Refer to the curriculum office website for the Curriculum Committee meeting schedule and submission deadlines. You are encouraged to send submissions prior to the deadline so that the curriculum office may review and provide feedback.
3. Course submissions will be placed on the next agenda with available time slots. You will be notified of your submission's time for review, and you will be sent a signature page that may be completed electronically or manually by your department chair and department dean. It is the submitter's responsibility to ensure that completed signature pages are delivered to the Curriculum Office the day before the Curriculum Committee meeting for which the submission is scheduled. Submissions without signed signature pages will be postponed.
4. It is not mandatory that you attend the Curriculum Committee meeting in which your submission is scheduled for review; however, it is strongly encouraged that you attend so that you may represent your submission and respond to any committee questions. Unanswered questions may result in a submission being rescheduled for further clarification.

COLUMBIA GORGE COMMUNITY COLLEGE

Aviation Maintenance: Airframe 1

Course Number: AMT 261

Transcript Title: Aviation Maintenance: Airframe 1

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 195 (/courses/amt-105)

Course Description

Details ice and rain control systems and associated warning systems. Examines the fundamentals of installation, operation and maintenance of airborne communication and navigation instruments, and auto flight systems. Introduces methods of assembly and rigging commonly used in preparing aircraft for a safe test flight. Provides welding fundamentals in relation to aircraft repair. Prerequisites: AMT 195. Audit available.

Course Outcomes

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

1. Demonstrate knowledge of aerodynamics and its relationship to aircraft assembly and rigging.
2. Assemble, rig, and inspect aircraft using proper procedures and techniques.
3. Apply the principles of operation and maintenance procedures to communication, navigation, and inter-graded flight control systems.
4. Demonstrate basic welding techniques.
5. Service and repair ice and rain control system.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Demonstrate knowledge of aerodynamics and its relationship to aircraft assembly and rigging.

- Rig rotary-wing aircraft
- Rig fixed-wing aircraft
- Check alignment of structures
- Balance, rig and inspect moveable primary and secondary flight control surfaces

Outcome #2: Assemble, rig, and inspect aircraft using proper procedures and techniques.

- Assemble aircraft components, including flight control surfaces
- Balance, rig, and inspect movable primary and secondary flight control surfaces
- Jack aircraft
- Prepare fuselage for alignment check
- Method and significance of expressing reference positions

Outcome #3: Apply the principles of operation and maintenance procedures to communication, navigation, and inter-graded flight control systems.

- Inspect and troubleshoot autopilot, servos and approach coupling systems
- Inspect and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static discharge devices, aircraft VOR, ILS, Radar beacon transponders, flight management computers, and GPWS
- Inspect and repair antenna and electronic equipment installations
- Inspect, troubleshoot, service, and repair airframe ice and rain control systems

Outcome #4: Demonstrate basic welding techniques.

- Weld magnesium and titanium
- Solder stainless steel
- Fabricate tubular structures
- Solder, braze, gas-weld, and arc-weld steel
- Weld aluminum and stainless steel

Outcome #5: Service and repair ice and rain control system.

- Install deicer boots
- Understand operating principles of anti-icing systems
- Protect deicer boots from deterioration

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration;

Introduction to Aircraft Maintenance, 3rd Edition, Avotek

COLUMBIA GORGE
COMMUNITY COLLEGE

The Dalles Campus

400 East Scenic Drive

The Dalles, OR 97058

Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20

(541) 506-6000 (tel:5415066000)

Hood River Center

1730 College Way

Hood River, OR 97031-7502

Click address for directions/map. (https://maps.google.com/?

Aviation Maintenance: Airframe 2

Course Number: AMT 262

Transcript Title: Aviation Maintenance: Airframe 2

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 261 (/courses/amt-261)

Course Description

Examines the inspection and repair of aircraft landing gear and hydraulic and pneumatic system components. Introduces various airframe systems, specifically position and warning systems. Prerequisites: AMT 261. Audit available.

Course Outcomes

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

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

4. Inspect and service or repair speed and configuration warning systems, electrical brake controls and antiskid systems.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Inspect and safely perform maintenance and repair of aircraft landing gear, hydraulic and pneumatic systems and their components, in accordance with the manufacturer's service manuals, acceptable industry practices, and applicable regulations.

- Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.

- Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.
- Repair hydraulic and pneumatic power systems components
- Service hydraulic reservoirs

Outcome #2: Identify and apply basic theory and computation skills regarding hydraulic and pneumatic power as they relate to landing gear and various aircraft structure mechanical advantage devices.

- Perform hydraulic pressure equalization to single disc brake and replacement of brake lining.
- Determine causes of incorrect system pressure.
- Apply operating principles of hydraulic brake antiskid system.
- Understand F=AP and V=AL calculations.
- Identify and select hydraulic fluids.

Outcome #3: Identify and apply the principles of function and safe operation of landing gear, hydraulic and pneumatic systems and position and warning systems.

- Inspect, check, troubleshoot, and service landing gear position indicating and warning systems.
- Adjust landing gear alignment
- Understand operation of oleo struts during landing and the function of metering pin
- Determine and correct various brake system malfunctions

Outcome #4: Inspect and service or repair speed and configuration warning systems, electrical brake controls and antiskid systems.

- Determine cause of a gear unsafe warning signal
- Identify the effect of various electrical faults in the operation of the landing gear warning system
- Apply general requirements for installing skid detectors

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

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COLUMBIA GORGE COMMUNITY COLLEGE

Aviation Maintenance: Airframe 3

Course Number: AMT 263

Transcript Title: Aviation Maintenance: Airframe 3

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 262 (/courses/amt-262)

Course Description

Introduces sheet metal, its properties, and uses in fabrication of structural and nonstructural components of aerospace vehicles. Addresses inspection techniques along with fabrication and repair processes for bending, cutting, forming, drilling, and riveting aluminum sheet metal parts. Prerequisites: AMT 262. Audit available.

Course Outcomes

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

1. Apply computation skills and interpret drawings and instructions for the preparation of aircraft structural repairs and alterations.
2. Identify and use appropriate aircraft sheet metal hand and shop tools during the preparation and fabrication of aircraft structural repair parts.
3. Select and install various sizes of conventional rivets and special fasteners using proper preparation and technique.
4. Identify and apply acceptable methods, techniques and practices during the assembly and repair of aircraft sheet metal structures.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Apply computation skills and interpret drawings and instructions for the preparation of aircraft structural repairs and alterations.

- Calculate flat layout dimensions
- Determine neutral axis
- Calculate amount of material based on bend
- Determine flat layout dimensions prior to bending
- Form, lay out, and bend sheet metal

Outcome #2: Identify and use appropriate aircraft sheet metal hand and shop tools during the preparation and fabrication of aircraft structural repair parts.

- Demonstrate use of a reamer
- Demonstrate use of twist drills
- Perform dimpling process
- Form metal by bumping

Outcome #3: Select and install various sizes of conventional rivets and special fasteners using proper preparation and technique.

- Select, install, and remove special fasteners for metallic, bonded, and composite structures.
- Determine rivet length and diameter
- Install conventional rivets
- Operate air-operated riveting gun

Outcome #4: Identify and apply acceptable methods, techniques and practices during the assembly and repair of aircraft sheet metal structures.

- Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures
- Prepare dissimilar metals for assembly
- Detect bearing failure of sheet metal
- Perform watertight joint construction

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration;
Introduction to Aircraft Maintenance, 3rd Edition, Avotek

Related Instruction

Computation: 19.5 Hours

Outcomes

1. Apply computation skills and interpret drawings and instructions for the preparation of aircraft structural repairs and alterations.

Content

- Calculate flat layout dimensions (RI hours 4.5)
- Determine neutral axis (RI hours 6)
- Calculate amount of material based on bend (RI hours 4.5)
- Determine flat layout dimensions prior to bending (RI hours 4.5)

Aviation Maintenance: Airframe 4

Course Number: AMT 264

Transcript Title: Aviation Maintenance: Airframe 4

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 263 (/courses/amt-263)

Course Description

Examines the theory and techniques used in the fabrication, inspection, repair, and finishing of bonded structures, plastics, wood structures, fabric covering, honeycomb structures, and advanced composite structures. Details the environmental control systems (head, air conditioning, pressurization, oxygen). Prerequisites: AMT 263. Audit available.

Course Outcomes

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

1. Fabricate, and perform repairs to wood and plastic components and composite structures.
2. Determine the criteria for selecting special fastener systems used in composite structures.
3. Identify approved aircraft fabric covering processes, materials, and inspection procedures.
4. Select and apply aircraft finishing materials.

5. Inspect, troubleshoot and repair cabin atmosphere control systems.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Fabricate, and perform repairs to wood and plastic components and composite structures.

- Inspect bonded structures
- Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures

- Inspect, check, service, and repair windows, doors, and interior furnishings
- Identify appropriate glue for repair and construction
- Determine strength of wood structures

Outcome #2: Determine the criteria for selecting special fastener systems used in composite structures.

- Select, install, and remove special fasteners for metallic, bonded, and composite structures
- Install conventional rivets
- Repair elongated bolt holes
- Identify stresses on rivets
- Apply deicer boot fasteners

Outcome #3: Identify approved aircraft fabric covering processes, materials, and inspection procedures.

- Select and apply fabric and fiberglass covering materials
- Inspect, test, and repair fabric and fiberglass
- Repair doped and lapped seams
- Make a sewn repair

Outcome #4: Select and apply aircraft finishing materials.

- Apply trim, letters, and touchup paint
- Identify, select and apply aircraft finishing materials

- Determine requirements for registration markings
- Identify spray painting defects caused by improper techniques

Outcome #5: Inspect, troubleshoot and repair cabin atmosphere control systems.

- Inspect, troubleshoot, service, and repair heating, cooling, air conditioning, pressurization systems, and air cycle machines
- Inspect, check, troubleshoot, service and repair oxygen systems
- Identify sources of Freon system contamination
- Apply principles to provide and control pressurization

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

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COMMUNITY COLLEGE

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Aviation Maintenance: Airframe Return to Service

Course Number: AMT 281

Transcript Title: Aviation Maintenance: Airframe Return to Service

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 0

Lab Hours: 90

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 264 (/courses/amt-264)

Course Description

Provides diversified projects, supervised field experiences and FAA examination review for Airframe production. Prerequisite: AMT 264. Audit available.

Course Outcomes

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

1. Read, comprehend and apply FAA and manufacturer's aircraft maintenance specifications and data sheets.
2. Balance, rig and inspect flight control surfaces.
3. Utilize the skills that are expected of those entering the aviation maintenance industry as a certified Aircraft Mechanic with an airframe rating.
4. Make independent and accurate airworthiness judgments appropriate to Airframe Subject Area content.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Read, comprehend and apply FAA and manufacturer's aircraft maintenance specifications and data sheets.

- Write maintenance record with description of work performed, aircraft discrepancies and corrective actions taken
- Read, comprehend and apply information contained in FAA and manufacturer's maintenance specifications, data sheets and manuals
- Complete maintenance forms and inspection reports
- Read and apply technical data

Outcome #2: Balance, rig and inspect flight control surfaces.

- Measure control surface movement and adjust control stops
- Install and rig cables in flight control system
- Explain the relationship between specified movements of the cockpit controls and control surfaces
- Complete required maintenance forms and records

Outcome #3: **Utilize the skills that are expected of those entering the aviation maintenance industry as a certified Aircraft Mechanic with an airframe rating.**

- Inspect and repair sheet metal structures
- Assemble aircraft component
- Understand hydraulic and pneumatic power systems.
- Identify elements of fuel systems

Outcome #4: Make independent and accurate airworthiness judgments appropriate to Airframe Subject Area content.

- Perform airframe conformity and airworthiness inspections
- Inspect, adjust, repair, replace, assemble and/or rig aircraft
- Assemble aircraft components, including flight control surfaces
- Complete inspection report including aircraft discrepancies and corrective actions

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	Aviation Maintenace Technology	Submitter name: phone: email:	Tyson M Aldrich taldrich@cgcc.edu
License/Certification Title:	FAA Powerplant Rating	Granting Institution(s)/Agency(s):	FAA
Course Equivalency:	Course Title(s):	AMT 191, 192, 193, 194A, 194B, 195, 271, 272, 273, 274, 282	
	Credits:	57 total	
Potential application to current awards:	Aviation Airframe certificate, Aviation Powerplant certificate, Aviation Maintenance Technology certificate, Aviation Maintenance Technology AAS		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	**AMT 191 Aviation Maintenance: General 101** **Description:** Introduces aircraft cleaning, corrosion control, materials, and aircraft hardware. Covers the selection of appropriate cleaning chemicals and processes. Describes the identification, selection, and installation of aircraft hardware, fluid lines, and fittings. Examines the performance of aircraft processes such as heat treating and hardness testing. Prerequisites: MTH 65 or equivalent placement; placement into IRW 115 or WR 115. Audit available. **Outcomes/content:** **Outcome #1: Identify and select aircraft materials used in performing aircraft cleaning and corrosion control, fluid line maintenance, and non-destructive inspection of ferrous and non-ferrous materials.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1 • AM.I.G.K1 Aircraft cleaning procedures. • AM.I.G.K2 Corrosion theory and causation. • AM.I.G.K3 Types and effects of corrosion. • AM.I.G.K4 Corrosion-prone areas in aircraft. • AM.I.G.K5 Corrosion preventive maintenance procedures. • AM.I.G.K6 Corrosion identification and inspection. • AM.I.G.K7 Corrosion removal and treatment procedures. • AM.I.G.K8 Corrosion preventive compounds (CPC) (e.g., waxy sealants, thin-film dielectrics). • AM.I.G.K9 Selection of optimal CPC and frequency of treatment. • AM.I.G.K10 Use of high-pressure application equipment.

- AM.I.G.K11 Improper use of cleaners on aluminum or composite materials. AM.I.G.K12 Dissimilar metals causing accelerated corrosion and role of protective barriers to mitigate this risk.
- AM.I.G.K13 Conversion coatings.
- AM.I.G.K14 Materials used for protection of airframe structures.
- AM.I.G.K15 Primer materials.
- AM.I.G.K16 Topcoat materials.
- AM.I.G.K17 Surface preparation for a desired finishing material.
- AM.I.G.K18 Effects of ambient conditions on finishing materials.
- AM.I.G.K19 Effects of improper surface preparation on finishing materials. AM.I.G.K20 Regulatory requirements for replacing identification, registration markings, and placards.
- AM.I.G.K21 Inspection of aircraft finishes.
- AM.I.G.K22 Safety practices/precautions when using finishing materials (e.g., PPE, fire prevention).
- AM.I.G.K23 Finishing materials application techniques and practices.
- AM.I.G.K24 Control surface balance considerations after refinishing.

Outcome 2: Apply FAA acceptable methods, techniques, and practices during aircraft maintenance operations.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.I.K1 Privileges and limitations of a mechanic certificate.
- AM.I.I.K2 Recent experience requirements and how to re-establish once lost.
- AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations.
- AM.I.I.K4 Maintenance record entry for approval for return to service after inspection.
- AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
- AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.

	• AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates. • AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices. • AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals. • AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator. • AM.I.I.K16 Difference between approved data and acceptable data, and when each is required. • AM.I.I.K17 FAA-approved airworthiness limitations. • AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals. • AM.I.I.K19 Inoperative equipment. • AM.I.I.K20 Discrepancy records or placards. • AM.I.I.K21 Usable on (effectivity) codes in parts manuals. • AM.I.I.K22 Methods used to establish the serial number effectivity of an item. • AM.I.I.K23 Mechanic address change notification procedures **Outcome 3: Utilize appropriate non-destructive testing methods commonly employed in the aircraft industry.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3 • AM.I.K.K3 Nondestructive Testing (NDT) procedures and methods. • AM.I.K.K4 Aircraft inspection programs (e.g., progressive, 100-hour, annual, and other FAA-approved inspections). • AM.I.K.K5 Aircraft inspection methods and tools for materials, hardware, and processes. **Outcome 4: Apply math and physics principles in solving problems associated with aviation maintenance.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 4 • AM.I.H.K1 Areas of various geometrical shapes. • AM.I.H.K2 Volumes of various geometrical shapes. • AM.I.H.K3 Definitions, descriptions and use of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse. • AM.I.H.K4 Ratio problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s) operation. • AM.I.H.K5 Proportion and percentage problems, including examples of where or how they may be used in relation to aircraft maintenance or system(s)

operation.

- AM.I.H.K6 Algebraic operations, including examples of where or how they may be used in relation to aircraft maintenance.
- AM.I.H.K7 Conditions or areas in which metric conversion may be necessary.
- AM.I.H.K8 Scientific (exponential) notation, decimal notation, fractional notation, binary notation, and conversion between these various forms of numeric notation.
- AM.I.H.K9 Rounding numbers.
- AM.I.H.K10 Powers and special powers.
- AM.I.H.K11 Measurement systems.
- AM.I.H.K12 Use of positive and negative integers in mathematical operations.
- AM.I.H.K13 Basic mathematic functions (addition, subtraction, multiplication, division).

AMT 192 Aviation Maintenance: General 102

Description: Examines the government's involvement in aviation maintenance, and FAA regulations regarding aviation maintenance and approved training programs. Emphasizes the use of maintenance publications, maintenance forms and records, and technicians' privileges and limitations. Addresses aircraft weight and balance procedures and associated record keeping, aircraft drawings and ground operations and servicing. Prerequisite: AMT 191. Audit available.

Outcomes/content:

Outcome 1: Use aircraft drawings and other graphic information in performing aircraft maintenance and alterations.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.I.B.K1 Drawings, blueprints, sketches, charts, graphs, and system schematics, including commonly used lines, symbols, and terminology.
- AM.I.B.K2 Repair or alteration of an aircraft system or component(s) using drawings, blueprints, or system schematics to determine whether it conforms to its type design.
- AM.I.B.K3 Inspection of an aircraft system or component(s) using drawings, blueprints, or system schematics.
- AM.I.B.K4 Terms used in conjunction with aircraft drawings, blueprints, or system schematics.

Outcome 2: Perform a complete aircraft weight and balance procedure, including preparation of required documentation and records.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.C.K1 Weight and balance terminology.
- AM.I.C.K2 Purpose for weighing an aircraft.
- AM.I.C.K3 Weighing procedures, including the general preparations for weighing, with emphasis on aircraft weighing area considerations.

	• AM.I.C.K4 Procedures for calculation of the following: arm, positive or negative moment, center of gravity (CG), or moment index. • AM.I.C.K5 Purpose and application of weight and CG limits. • AM.I.C.K6 Purpose of determining CG. • AM.I.C.K7 Adverse loading considerations and how to calculate if adverse loading causes an out-of-limit condition. • AM.I.C.K8 Determine proper empty weight configuration. AM.I.C.K9 Proper ballast placement. • AM.I.C.K10 Jacking an aircraft. **Outcome 3: Identify typical ground operation hazards when moving, securing and servicing aircraft.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3 • AM.I.F.K1 Aircraft towing procedures. • AM.I.F.K2 Aircraft securing procedures. • AM.I.F.K3 Aviation fueling/defueling procedures. • AM.I.F.K4 Airport operation area procedures and ATC communications, including runway incursion prevention. • AM.I.F.K5 Engine starting, ground operation, and aircraft taxiing procedures. **Outcome 4: Demonstrate ability to read, comprehend and apply information contained in FAA and manufacturer's aircraft specifications and other airworthiness directives and advisory materials.** ACS knowledge codes tested during FAA General Written, and Alignment with outcome 4 • AM.I.I.K1 Privileges and limitations of a mechanic certificate. • AM.I.I.K2 Recent experience requirements and how to re-establish once lost. AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations. • AM.I.I.K4 Maintenance record entry for approval for return to service after inspection. • AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3). • AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair). • AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor. • AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics. • AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).

- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.
- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
- AM.I.I.K19 Inoperative equipment.
- AM.I.I.K20 Discrepancy records or placards.
- AM.I.I.K21 Usable on (effectivity) codes in parts manuals.
- AM.I.I.K22 Methods used to establish the serial number effectivity of an item.

Outcome 5: Identify and implement aircraft requirements for safe starting, ground operation and movement, servicing and securing.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 5

- AM.I.F.K1 Aircraft towing procedures.
- AM.I.F.K2 Aircraft securing procedures.
- AM.I.F.K3 Aviation fueling/defueling procedures.
- AM.I.F.K4 Airport operation area procedures and ATC communications, including runway incursion prevention.
- AM.I.F.K5 Engine starting, ground operation, and aircraft taxiing procedures
- AM.I.F.K8 Oxygen system servicing procedures.
- AM.I.F.K9 Characteristics of aviation gasoline and turbine fuels, including basic types and means of identification.
- AM.I.F.K10 Fuel additives commonly used in the field.
- AM.I.F.K11 Use of approved grades/types of fuel in aircraft engines.
- AM.I.F.K12 Tool and hardware use and accountability.
- AM.I.F.K13 Material handling.
- AM.I.F.K14 Parts protections.
- AM.I.F.K15 Hazardous materials, Safety Data Sheets (SDS), and PPE.
  AM.I.F.K16 Foreign object damage effects.

AMT 193 Aviation Maintenance: General 103

Description: Examines the theory and application of basic DC and AC electrical concepts, definitions, and laws. Introduces passive electrical components, electrical sources, schematic symbols, and electrical wiring diagrams. Explains the methods of safe and accurate measurement of DC and AC electrical quantities using basic electrical test equipment. Provides troubleshooting defective components, observing the characteristics of electrical components in test circuits, and wiring circuits from schematic diagrams. Prerequisites: AMT 192. Audit available.

Outcomes/content:

Outcome 1: Apply electrical theory to aircraft systems and components.

Outcome 2: Identify and apply the factors affecting voltage, resistance and current to aircraft electrical circuits.

Outcome 3: Measure and calculate electrical power.

Outcome 4: Identify electrical components and interpret wiring diagrams.

Outcome 5: Demonstrate electrical testing and monitoring instruments for aircraft electrical circuits.

Outcome 6: Calculate and measure capacitance and inductance.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1-6

- AM.I.A.K1 Electron theory (conventional flow vs. electron flow).
- AM.I.A.K2 Magnetism.
- AM.I.A.K3 Capacitance in a circuit.
- AM.I.A.K4 Inductance in a circuit.
- AM.I.A.K5 Alternating current (AC) electrical circuits.
- AM.I.A.K6 Direct current (DC) electrical circuits.
- AM.I.A.K7 Electrical laws and theory.
- AM.I.A.K7a a. Ohm's Law
- AM.I.A.K7b b. Kirchhoff's Laws
- AM.I.A.K7c c. Watt's Law
- AM.I.A.K7d d. Faraday's Law
- AM.I.A.K7e e. Lenz's Law
- AM.I.A.K7f f. Right-hand motor rule
- AM.I.A.K8 Electrical measurement tools, principles, and procedures.
- AM.I.A.K9 Voltage.
- AM.I.A.K9a a. Regulation
- AM.I.A.K10 Current.
- AM.I.A.K11 Resistance.
- AM.I.A.K11a a. Impedance
- AM.I.A.K11b b. Resistance in series
- AM.I.A.K11c c. Resistance in parallel
- AM.I.A.K11d d. Total resistance
- AM.I.A.K12 Power.

- AM.I.A.K13 Series circuits.
- AM.I.A.K14 Parallel circuits.
- AM.I.A.K15 Aircraft batteries.
- AM.I.A.K16 Transformers.
- AM.I.A.K17 Circuit continuity.
- AM.I.A.K18 Controlling devices, including switches and relays.
- AM.I.A.K19 Protective devices, including fuses, circuit breakers, and current limiters.
- AM.I.A.K20 Resistor types and color coding.
- AM.I.A.K21 Semiconductors, including diodes, transistors, and integrated circuits.

AMT 194A Aviation Maintenance: General 104A

Description: Explores airframe electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the application of electrical principles used in sensing, indicating and control of airframe systems. Prerequisites: AMT 193. Audit available.

Outcomes/content:

Outcome 1: Repair and inspect aircraft electrical system components.

Outcome 2: Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1-2

- AM.I.A.S1 Perform circuit continuity test.
- AM.I.A.S2 Measure voltage.
- AM.I.A.S3 Measure current.
- AM.I.A.S4 Measure resistance.
- AM.I.A.S5 Test a switch or relay.
- AM.I.A.S6 Test a fuse or circuit breaker.
- AM.I.A.S7 Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
- AM.I.A.S8 Troubleshoot a circuit.
- AM.I.A.S9 Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
- AM.I.A.S10 Demonstrate how to test for short-circuit and open-circuit conditions.
- AM.I.A.S11 Measure voltage drop across a resistor.
- AM.I.A.S12 Determine or measure for open electrical circuits.
- AM.I.A.S13 Inspect an aircraft battery.
- AM.I.A.S14 Service an aircraft battery.

Outcome 3: Read and interpret aircraft circuit diagrams.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.A.K25 Electrical circuit drawings

AMT 194B Aviation Maintenance: General 104B

Description: Explores engine electrical components, including the inspection, service and repair of alternating and direct current electrical systems. Examines the application of electrical principles used in sensing, indicating and control of powerplant systems. Prerequisite/concurrent: AMT 194A. Audit available.

Outcomes/content:

Outcome 1: inspect, check, and troubleshoot constant speed and integrated speed drive generators.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.I.A.K25 Electrical circuit drawings.
- AM.I.A.K26 Complex/combined circuits.
- AM.I.A.K27 AC and DC motors.
- AM.III.F.K1 Generators.
- AM.III.F.K2 Alternators.
- AM.III.F.K3 Starter generators.
- AM.III.F.K4 Voltage regulators and overvoltage and overcurrent protection. AM.III.F.K5 DC generation systems.
- AM.III.F.K6 AC generation systems.

Outcome 2: Repair engine electrical system components.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.III.F.S1 Inspect engine electrical wiring, switches, and protective devices.
- AM.III.F.S2 Determine suitability of a replacement component by part number.
- AM.III.F.S3 Replace an engine-driven generator or alternator.
- AM.III.F.S4 Inspect an engine-driven generator or alternator in accordance with manufacturer's instructions.
- AM.III.F.S5 Troubleshoot an aircraft electrical generating system.
- AM.III.F.S6 Remove and install an engine direct-drive electric starter.
- AM.III.F.S7 Troubleshoot a direct-drive electric starter system.

Outcome 3: Install and service engine electrical wiring, controls, switches, indicators and protective devices.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3

- AM.I.A.S1 Perform circuit continuity test.
- AM.I.A.S2 Measure voltage.
- AM.I.A.S3 Measure current.
- AM.I.A.S4 Measure resistance.
- AM.I.A.S5 Test a switch or relay.
- AM.I.A.S6 Test a fuse or circuit breaker.
- AM.I.A.S7 Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
- AM.I.A.S8 Troubleshoot a circuit.
- AM.I.A.S9 Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
- AM.I.A.S10 Demonstrate how to test for short-circuit and open-circuit conditions.
- AM.I.A.S11 Measure voltage drop across a resistor.
- AM.I.A.S12 Determine or measure for open electrical circuits.
- AM.I.A.S13 Inspect an aircraft battery.
- AM.I.A.S14 Service an aircraft battery.

AMT 195 Aviation Maintenance: General 105

Description: Examines the use of mechanical and electronic systems in sensing, communicating, and displaying information. Explores solid state and digital devices, sensors, and special circuits used in aircraft instrumentation systems, fuel systems and fire protection systems. Analyzes the methods used in testing, inspecting, and troubleshooting those systems. Prerequisites: AMT 194 or (AMT 194A and AMT 194B). Audit available.

Outcomes/content:

Outcome 1: Apply the principles of operation and system troubleshooting methods for aircraft and engine instruments.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 1

- AM.III.D.K1 Fuel flow.
- AM.III.D.K2 Temperature (e.g., exhaust gas, oil, oil cylinder head, turbine inlet).
- AM.III.D.K3 Engine speed indicating systems.
- AM.III.D.K4 Pressure (e.g., air, fuel, manifold, oil).
- AM.III.D.K5 Annunciator indicating systems (e.g., warning, caution, and advisory lights).
- AM.III.D.K6 Torquemeters.
- AM.III.D.K7 Engine pressure ratio (EPR).
- AM.III.D.K8 Engine indicating and crew alerting system (EICAS).
- AM.III.D.K9 Digital engine control module (e.g., full authority digital engine

controls (FADEC)).

- AM.III.D.K10 Electronic centralized aircraft monitor (ECAM).
- AM.III.D.K11 Engine instrument range markings and instrument conditions.

Outcome2: Apply electrical schematics to troubleshoot and repair aircraft fire protection systems.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 2

- AM.I.B.R3 Applicability of the drawing or schematic to the particular aircraft by model and serial number.

Outcome 3: Perform airframe and engine conformity inspections.

Outcome 4: Identify, troubleshoot and repair aircraft and engine fuel systems.

ACS knowledge codes tested during FAA General Written, and Alignment with outcome 3 & 4

- AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations.
- AM.I.I.K4 Maintenance record entry for approval for return to service after inspection.
- AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
- AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.
- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when

each is required.

- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.
- AM.I.I.K19 Inoperative equipment.
- AM.I.I.K20 Discrepancy records or placards.
- AM.I.I.K21 Usable on (effectivity) codes in parts manuals.
- AM.I.I.K22 Methods used to establish the serial number effectivity of an item.

AMT 271 Aviation Maintenance: Powerplant 1

Description: Introduces the theory of operation and construction of the internal combustion engine. Examines the combustion processes, design rationale, cooling and lubrication of internal combustion of reciprocating engines. Prerequisite: AMT 195. Audit available.

Outcomes/content:

Outcome 1: Apply knowledge of construction and operation to the maintenance, repair and troubleshooting of aircraft reciprocating engines.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 1:

- AM.III.A.K1 Types of reciprocating engines.
- AM.III.A.K2 Reciprocating engine operating principles/theory of operation.
- AM.III.A.K3 Internal combustion engine operating principles/theory of operation.
- AM.III.A.K4 Horizontally-opposed engine construction and internal components.
- AM.III.A.K5 Radial engine construction and internal components.
- AM.III.A.K6 Storage and preservation.
- AM.III.A.K7 Reciprocating engine performance (e.g., PLANK, SFC).
- AM.III.A.K8 Reciprocating engine maintenance and inspection.
- AM.III.A.K9 Reciprocating engine ground operations.
- AM.III.A.K10 Diesel engine operating principles/theory of operation.
- AM.III.A.S1 Perform a cylinder assembly inspection.
- AM.III.A.S2 Operate and troubleshoot a reciprocating engine.
- AM.III.A.S3 Install piston and knuckle/wrist pin(s).
- AM.III.A.S4 Identify the parts of a cylinder.
- AM.III.A.S5 Identify the parts of a crankshaft.
- AM.III.A.S6 Identify and inspect various types of bearings.

Outcome 2: Overhaul an aircraft reciprocating engine, implementing the complete inspection of each component for compliance with appropriate regulations and airworthiness standards.

	ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 2: • AM.III.A.R4 Use of other than manufacturer's procedures during maintenance. • AM.III.A.K4 Horizontally-opposed engine construction and internal components. • AM.III.A.K5 Radial engine construction and internal components. **Outcome 3: Inspect and troubleshoot engine installations.** ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 3: • AM.III.A.K8 Reciprocating engine maintenance and inspection. • AM.III.A.S1 Perform a cylinder assembly inspection. **Outcome 4: Implement the proper use of precision measuring tools during the overhaul process of an aircraft reciprocating engine.** ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 4: • AM.III.A.K8 Reciprocating engine maintenance and inspection. • AM.I.K.R2 Using precision measuring instruments. • AM.I.K.R3 Calibration of precision measuring equipment. • AM.I.K.R4 Selection of inspection techniques. • AM.I.K.S1 Use Vernier calipers. • AM.I.K.S2 Use micrometers. • AM.I.K.S3 Use measurement gauges. • AM.I.K.S4 Perform a visual inspection. • AM.I.K.S5 Perform a dye penetrant inspection. • AM.I.K.S6 Inspect aircraft for compliance with an AD. **Outcome 5: Identify, analyze and apply strategies for the research of all current manufacturer service information, and other airworthiness requirements including airworthiness directives, prior to the maintenance, repair or overhaul of aircraft reciprocating engines.** ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 5 • AM.I.I.K1 Privileges and limitations of a mechanic certificate. • AM.I.I.K2 Recent experience requirements and how to re-establish once lost. • AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations. • AM.I.I.K4 Maintenance record entry for approval for return to service after inspection. • AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3). • AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in

service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).

- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.
- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals.

AMT 272 Aviation Maintenance: Powerplant 2

Description: Examines the disassembly, assembly, inspection and repair of aircraft turbine engines. Emphasizes the use of technical data, appropriate tools and inspection devices along with special safety procedures related to the servicing, operation and repair of turbine engines. Addresses turbine driven auxiliary power units. Prerequisites: AMT 271. Audit available.

Outcome 1: Apply the principles of turbine engine operation and thrust production during the maintenance and repair of aircraft turbine engines.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 1:

- AM.III.B.K1 Turbine engine operating principles/theory of operation.
- AM.III.B.K2 Types of turbine engines.
- AM.III.B.K3 Turbine engine construction and internal components.
- AM.III.B.K4 Turbine engine performance and monitoring.
- AM.III.B.K5 Turbine engine troubleshooting, maintenance, and inspection procedures.

- AM.III.B.K6 Procedures required after the installation of a turbine engine.
- AM.III.B.K7 Causes for turbine engine performance loss.

Outcome 2: Identify the principles of turbine engine component operation and their impact on the operation of the aircraft turbine engine and its auxiliary units.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 2:

- AM.III.B.K7 Causes for turbine engine performance loss.
- AM.III.B.K8 Bleed air systems.
- AM.III.B.K9 Storage and preservation.
- AM.III.B.K10 Auxiliary power unit(s).
- AM.III.B.K11 Turbine engine adjustment and testing.
- AM.III.B.S1 Identify different turbine compressors.
- AM.III.B.S2 Identify different types of turbine engine blades.
- AM.III.B.S3 Identify components of turbine engines.
- AM.III.B.S4 Map airflow direction and pressure changes in turbine engines.
- AM.III.B.S5 Remove and install a fuel nozzle in a turbine engine.
- AM.III.B.S6 Inspect a combustion liner.
- AM.III.B.S7 Locate the procedures for the adjustment of a fuel control unit.
- AM.III.B.S8 Perform turbine engine inlet guide vane and compressor blade inspection.
- AM.III.B.S9 Locate the installation or removal procedures for a turbine engine.
- AM.III.B.S10 Locate and explain the procedure for trimming a turbine engine.
- AM.III.B.S11 Identify damaged turbine engine blades.
- AM.III.B.S12 Identify causes for turbine engine performance loss.

Outcome 3: Research and implement a strategy for accurate and timely maintenance of the overhaul of an aircraft turbine engine.

Outcome 4: Perform the overhaul of an aircraft turbine engine, implementing the complete inspection of each component for compliance with appropriate regulations and airworthiness standards

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 3 and 4:

- AM.III.C.K1 Inspection requirements under 14 CFR part 43 and 14 CFR part 91.
- AM.III.C.K2 Identification of life-limited parts and their replacement interval.
- AM.III.C.K3 Special inspections.
- AM.III.C.K4 Use of FAA-approved data.
- AM.III.C.K5 Compliance with service letters, service bulletins, instructions for continued airworthiness, ADs, or TCDSs.
- AM.III.C.K6 Maintenance recordkeeping requirements under 14 CFR part 43.
- AM.III.C.K7 Engine component inspection, checking, and servicing.
- AM.III.C.K8 Engine mounts, mounting hardware, and the inspection and

checking of each.

- AM.III.C.R3 Maintenance on an operating turbine engine.
- AM.III.C.S2 Evaluate powerplant for compliance with FAA-approved or manufacturer data.
- AM.III.C.S3 Perform a powerplant records inspection.
- AM.III.C.S4 Inspect for compliance with applicable ADs.
- AM.III.C.S5 Determine engine installation eligibility.
- AM.III.C.S6 Determine compliance with engine specifications, TCDS, or engine listings.
- AM.III.C.S7 Perform a portion of a required inspection on an engine.
- AM.III.C.S8 Check engine controls for proper operation and adjustment.
- AM.III.C.S9 Inspect an engine for leaks after performing maintenance.
- AM.III.C.S10 Inspect an aircraft engine accessory for serviceability.
- AM.III.C.S11 Inspect engine records for time or cycles on life-limited parts.
- AM.III.C.S12 Perform an engine start and inspect engine operational parameters.
- AM.III.C.S13 Perform a portion of a 100-hour inspection on an engine in accordance with part 43.
- AM.III.C.S14 Inspect an engine mount to determine serviceability.

AMT 273 Aviation Maintenance: Powerplant 3

Description: Covers reciprocating and turbine engine ignition system theories and overhaul practices, as well as the relationships of the complete ignition system to the powerplant and its operation. Covers proper inspection of the entire engine installation, including exhaust systems, airflow, and cooling systems. Prerequisites: AMT 272. Audit available.

Outcomes/content:

Outcome 1: Safely perform aircraft reciprocating and turbine engine ignition system maintenance in accordance with the manufacturer service data, industry practices, and applicable regulations.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 1:

- AM.III.C.S5 Determine engine installation eligibility.
- AM.III.C.S6 Determine compliance with engine specifications, TCDS, or engine listings.
- AM.III.C.S7 Perform a portion of a required inspection on an engine.
- AM.III.C.S8 Check engine controls for proper operation and adjustment.
- AM.III.C.S9 Inspect an engine for leaks after performing maintenance.
- AM.III.C.S10 Inspect an aircraft engine accessory for serviceability.
- AM.III.C.S11 Inspect engine records for time or cycles on life-limited parts.
- AM.III.C.S12 Perform an engine start and inspect engine operational parameters.

	• AM.III.C.S13 Perform a portion of a 100-hour inspection on an engine in accordance with part 43. • AM.III.C.S14 Inspect an engine mount to determine serviceability. **Outcome 2: Inspect and repair engine exhaust systems, including thrust reverser systems.** ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 2: • AM.III.L.R1 Maintenance and inspection of exhaust system components. • AM.III.L.R2 Operation of turbine engine reversing systems. • AM.III.L.R3 Operation of reciprocating engines with exhaust systems leaks. • AM.III.L.R4 Exhaust system failures. • AM.III.L.R5 Ground operation of aircraft engines **Outcome 3: Troubleshoot ignition and starting systems and related engine system discrepancies in accordance with the manufacturer service data, industry practices, and applicable regulations.** ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 3: • AM.III.H.K1 Ignition system theory. • AM.III.H.K2 Spark plug theory. • AM.III.H.K3 Shower of sparks and impulse coupling. • AM.III.H.K4 Three electrical circuits of a magneto system. • AM.III.H.K5 Solid-state ignition systems. • AM.III.H.K6 Digital engine control module (e.g., FADEC). • AM.III.H.K7 Engine starters. • AM.III.H.K8 Magneto system components and operation. • AM.III.H.K9 Turbine engine ignition systems. • AM.I.I.K4 Maintenance record entry for approval for return to service after inspection. • AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3). • AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair). • AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor. • AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics. • AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD). • AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.

	• AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists. • AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates. • AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices. • AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals. • AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator. • AM.I.I.K16 Difference between approved data and acceptable data, and when each is required. • AM.I.I.K17 FAA-approved airworthiness limitations. • AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals. **Outcome 4: Identify and repair engine airflow and temperature control malfunctions.** ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 4: • AM.III.K.K1 Air cooling system theory, components, and operation. • AM.III.K.K2 Turbine engine cowling air flow. • AM.III.K.K3 Turbine engine internal cooling. • AM.III.K.K4 Turbine engine baffle and seal installation. • AM.III.K.K5 Turbine engine insulation blankets and shrouds. • AM.III.K.K6 Turbine engine induction system theory, components, and operation. • AM.III.K.K7 Turbine engine bleed air system theory, components, and operation. • AM.III.K.K8 Turbine engine anti-ice system • AM.III.K.S1 Perform an induction and cooling system inspection. • AM.III.K.S2 Identify location of turbine engine insulation blankets. • AM.III.K.S3 Identify turbine engine cooling air flow. • AM.III.K.S4 Inspect turbine engine cooling ducting (rigid or flexible) or baffle seals. • AM.III.K.S5 Inspect a turbine engine air intake anti-ice system. • AM.III.K.S6 Identify turbine engine ice and rain protection system components. • AM.III.K.S7 Inspect a particle separator. • AM.III.K.S8 Inspect/check a bleed air system.

AMT 274 Aviation Maintenance: Powerplant 4

Description: Introduces the many methods of fuel metering used to move air and fuel into and through an engine in a ratio producing safe and efficient engine operation under widely varying conditions. Examines proper inspection of the entire engine installation, including exhaust and lubrication systems, propellers and unducted fans. Prerequisites: AMT 273. Audit available.

Outcomes/content:

Outcome 1: Understand and apply the characteristics of aviation fuels, associated fuel systems, fuel metering methods and induction systems relative to engine/airframe installations.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 1:

- AM.III.I.K1 Fuel/air ratio and fuel metering, and carburetor theory and operation.
- AM.III.I.K2 Float carburetor theory, components, operation, and adjustment.
- AM.III.I.K3 Pressure carburetor theory, operation, and adjustment.
- AM.III.I.K4 Continuous-flow fuel injection theory, components, operation, troubleshooting and adjustment.
- AM.III.I.K5 Digital engine control module (e.g., FADEC).
- AM.III.I.K6 Hydromechanical fuel control system design and components.
- AM.III.I.K7 Fuel nozzles and manifolds design, operation, and maintenance.
- AM.III.I.K8 Components, theory, and operation of turbine engine fuel metering system.
- AM.III.I.K9 Inspection requirements for an engine fuel system.
- AM.III.I.K10 Fuel system operation.
- AM.III.I.K11 Fuel heaters.
- AM.III.I.K12 Fuel lines.
- AM.III.I.K13 Fuel pumps.
- AM.III.I.K14 Fuel valves.
- AM.III.I.K15 Fuel filters.
- AM.III.I.K16 Engine fuel drains

Outcome 2: Perform maintenance and inspection of fuel system, fuel metering, and induction systems using proper procedures and techniques.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 2:

- AM.III.I.S1 Inspect, troubleshoot, and repair a continuous-flow fuel injection system.
- AM.III.I.S2 Remove, inspect, and install a turbine engine fuel nozzle.
- AM.III.I.S3 Identify carburetor components.

- AM.III.I.S4 Identify fuel and air flow through a float-type carburetor.
- AM.III.I.S5 Remove and install a carburetor main metering jet.
- AM.III.I.S6 Inspect a carburetor fuel inlet screen.
- AM.III.I.S7 Adjust a continuous-flow fuel injection system.
- AM.III.I.S8 Inspect the needle, seat, and float level on a float-type carburetor.
- AM.III.I.S9 Remove and install a float-type carburetor.

Outcome 3: Identify and apply all current manufacturer service information, and other airworthiness requirements during the performance of maintenance and inspection of aircraft fixed and variable pitch propellers.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 3:

- AM.I.I.K3 Maintenance record entry for approval for return to service after maintenance and alterations.
- AM.I.I.K4 Maintenance record entry for approval for return to service after inspection.
- AM.I.I.K5 The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3).
- AM.I.I.K6 Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair).
- AM.I.I.K7 Criteria and responsibility for determining whether a repair or alteration is major or minor.
- AM.I.I.K8 The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics.
- AM.I.I.K9 Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD).
- AM.I.I.K10 Alternative Method of Compliance (AMOC) for an AD.
- AM.I.I.K11 Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- AM.I.I.K12 FAA databases and resources available, including TCDSs and supplemental type certificates.
- AM.I.I.K13 Compliance requirements for manufacturer-specified methods, techniques, and practices.
- AM.I.I.K14 Compliance requirements for manufacturer-specified maintenance and inspection intervals.
- AM.I.I.K15 FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator.
- AM.I.I.K16 Difference between approved data and acceptable data, and when each is required.
- AM.I.I.K17 FAA-approved airworthiness limitations.
- AM.I.I.K18 Alert, caution, and warning indications; and the basic definition of

warnings, cautions, and notes that are used in maintenance and operating manuals.

Outcome 4: Inspect and service engine lubrication systems.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 4:

- AM.III.G.S1 Inspect an oil cooler or oil lines.
- AM.III.G.S2 Determine the correct type of oil for a specific engine.
- AM.III.G.S3 Identify turbine engine oil filter bypass indicator.
- AM.III.G.S4 Determine approved oils for different climatic temperatures.
- AM.III.G.S5 Locate procedures for obtaining oil samples.
- AM.III.G.S6 Inspect an oil filter or screen.
- AM.III.G.S7 Perform oil pressure adjustment.
- AM.III.G.S8 Identify oil system components.
- AM.III.G.S9 Replace an oil system component.
- AM.III.G.S10 Identify oil system flow.
- AM.III.G.S11 Troubleshoot an engine oil pressure malfunction.
- AM.III.G.S12 Troubleshoot an engine oil temperature system.
- AM.III.G.S13 Identify types of metal found in an oil filter.
- AM.III.G.S14 Remove and inspect an engine chip detector.

AMT 282 Aviation Maintenance: Powerplant Return to Service

Description: Provides diversified projects, supervised field experiences and FAA examination review for Powerplant operations. Prerequisite: AMT 274. Audit available.

Outcomes/content:

Outcome 1: Utilize the skills that are expected of those entering the aviation maintenance industry as a certified Aircraft Mechanic with an Powerplant rating.

ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 1:

- AM.I.I.S1 Complete an FAA Form 337 for a major repair or alteration.
- AM.I.I.S2 Examine an FAA Form 337 for accuracy.
- AM.I.I.S3 Determine an aircraft's inspection status by reviewing the aircraft's maintenance records.
- AM.I.I.S4 Complete an aircraft maintenance record entry for the compliance of a reoccurring AD for a specific airframe, aircraft engine, appliance, or propeller.
- AM.I.I.S5 Compare an equipment list for an aircraft to equipment installed.
- AM.I.I.S6 Locate applicable FAA aircraft specifications and FAA TCDS for an aircraft or component.
- AM.I.I.S7 Complete an aircraft maintenance record entry for return to service.
- AM.I.I.S8 Determine applicability of an AD.

	• AM.I.I.S9 Check a Technical Standard Order (TSO) or part manufacturing authorization for the proper markings. • AM.I.I.S10 Use a manufacturer's illustrated parts catalog to locate a specific part number and applicability. • AM.I.I.S11 Locate supplemental type certificates applicable to a specific aircraft. • AM.I.I.S12 Determine the conformity of aircraft instrument range markings and placarding. • AM.I.I.S13 Determine approved replacement parts for installation on a given aircraft. • AM.I.I.S14 Determine maximum allowable weight of a specific aircraft. • AM.I.I.S15 Determine whether a given repair or alteration is major or minor. • AM.I.I.S16 Determine applicability of approved data for a major repair. • AM.I.I.S17 Explain the difference between "approved data" (required for major repair/alteration) and "acceptable data" (required for minor repair/alteration). • AM.I.I.S18 Complete a 100-hour inspection aircraft maintenance record entry. **Outcome 2: Make independent and accurate airworthiness judgments appropriate to Powerplant Subject Area content.** ACS knowledge codes tested during FAA Powerplant Written, and Alignment with outcome 2: • AM.I.I.S1 Complete an FAA Form 337 for a major repair or alteration. • AM.I.I.S2 Examine an FAA Form 337 for accuracy. • AM.I.I.S3 Determine an aircraft's inspection status by reviewing the aircraft's maintenance records. • AM.I.I.S4 Complete an aircraft maintenance record entry for the compliance of a reoccurring AD for a specific airframe, aircraft engine, appliance, or propeller. • AM.I.I.S5 Compare an equipment list for an aircraft to equipment installed. • AM.I.I.S6 Locate applicable FAA aircraft specifications and FAA TCDS for an aircraft or component. • AM.I.I.S7 Complete an aircraft maintenance record entry for return to service. • AM.I.I.S8 Determine applicability of an AD. • AM.I.I.S9 Check a Technical Standard Order (TSO) or part manufacturing authorization for the proper markings. • AM.I.I.S10 Use a manufacturer's illustrated parts catalog to locate a specific part number and applicability. • AM.I.I.S11 Locate supplemental type certificates applicable to a specific aircraft. • AM.I.I.S12 Determine the conformity of aircraft instrument range markings and placarding. • AM.I.I.S13 Determine approved replacement parts for installation on a given aircraft.

	• AM.I.I.S14 Determine maximum allowable weight of a specific aircraft. • AM.I.I.S15 Determine whether a given repair or alteration is major or minor. • AM.I.I.S16 Determine applicability of approved data for a major repair. • AM.I.I.S17 Explain the difference between "approved data" (required for major repair/alteration) and "acceptable data" (required for minor repair/alteration). • AM.I.I.S18 Complete a 100-hour inspection aircraft maintenance record entry. **Outcome 3: When eligible, competently sit for the FAA written, oral and practical certification testing.** This is accomplished through the issuance of the Powerplant Rating by an FAA DME, and successful completion of the FAA Powerplant Oral and Practical.
Other:	Students must have passed the FAA Powerplant Written Test, and Passed the Powerplant Oral and Practical Test. The student will possess an FAA Powerplant Rating. Since the FAA General Section of the AMT course is not a stand-alone rating, it is tested concurrently with the Powerplant section of the AMT rating or during the first FAA Oral and Practical test the student completes. Therefore, a student entering with a FAA Powerplant rating will also be awarded credit for the General Section of the AMT program.

SECTION #3 IMPLEMENTATION	
Implementation term:	☒ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW

"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."

Submitter	Email	Date
Tyson M Aldrich	Taldrich@cgcc.edu	05/02/2024
Department Chair (enter name of department chair): Jim Pytel		
Department Dean/Director (enter name of department dean/director): Robert Wells-Clark		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.

Aviation Maintenance: Powerplant 1

Course Number: AMT 271

Transcript Title: Aviation Maintenance: Powerplant 1

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 195 (/courses/amt-105)

Course Description

Introduces the theory of operation and construction of the internal combustion engine. Examines the combustion processes, design rationale, cooling and lubrication of internal combustion of reciprocating engines. Prerequisite: AMT 195. Audit available.

Course Outcomes

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

1. Apply knowledge of construction and operation to the maintenance, repair and troubleshooting of aircraft reciprocating engines.
2. Overhaul an aircraft reciprocating engine, implementing the complete inspection of each component for compliance with appropriate regulations and airworthiness standards.
3. Inspect and troubleshoot engine installations.
4. Implement the proper use of precision measuring tools during the overhaul process of an aircraft reciprocating engine.

5. Identify, analyze and apply strategies for the research of all current manufacturer service information, and other airworthiness requirements including airworthiness directives, prior to the maintenance, repair or overhaul of aircraft reciprocating engines.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Apply knowledge of construction and operation to the maintenance, repair and troubleshooting of aircraft reciprocating engines.

- Inspect and repair a reciprocating engine

- Understand construction characteristics of crankshaft and rod assembly
- Analyze operation of thrust bearings and crankshaft bearings
- Classify reciprocating engines and firing orders

Outcome #2: Overhaul an aircraft reciprocating engine, implementing the complete inspection of each component for compliance with appropriate regulations and airworthiness standards.

- Grind and reface valves and valve seats
- Purpose of choke or taper-ground cylinders
- Indications of failed engine bearings
- Repair scored pistons.

Outcome #3: Inspect and troubleshoot engine installations.

- Check engine valve clearances
- Perform compression check
- Test operation of ignition system
- Identify operating indications of a worn or weak engine.

Outcome #4: Implement the proper use of precision measuring tools during the overhaul process of an aircraft reciprocating engine.

- Measure inside diameter, taper and out-of-round of cylinder
- Check valve stem stretch
- Install and time magneto

- Repair a scored aluminum piston

Outcome #5: Identify, analyze and apply strategies for applying the research of all current manufacturer service information, and other airworthiness requirements including airworthiness directives, prior to the maintenance, repair or overhaul of aircraft reciprocating engines.

- Identify manufacturer engine service resources
- Research FAA airworthiness requirements
- Read and interpret service information and airworthiness requirements for application

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

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COMMUNITY COLLEGE

The Dalles Campus
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The Dalles, OR 97058
Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20
(541) 506-6000 (tel:5415066000)

Aviation Maintenance: Powerplant 2

Course Number: AMT 272

Transcript Title: Aviation Maintenance: Powerplant 2

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 271 (/courses/amt-271)

Course Description

Examines the disassembly, assembly, inspection and repair of aircraft turbine engines. Emphasizes the use of technical data, appropriate tools and inspection devices along with special safety procedures related to the servicing, operation and repair of turbine engines. Addresses turbine driven auxiliary power units. Prerequisites: AMT 271. Audit available.

Course Outcomes

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

1. Apply the principles of turbine engine operation and thrust production during the maintenance and repair of aircraft turbine engines.
2. Identify the principles of turbine engine component operation and their impact on the operation of the aircraft turbine engine and its auxiliary units.
3. Research and implement a strategy for accurate and timely maintenance of the overhaul of an aircraft turbine engine.

4. Perform the overhaul of an aircraft turbine engine, implementing the complete inspection of each component for compliance with appropriate regulations and airworthiness standards.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Apply the principles of turbine engine operation and thrust production during the maintenance and repair of aircraft turbine engines.

- Perform operation of thrust reversers
- Understand advantages of axial-flow compressors over centrifugal compressors

- Determine results of excessive operating temperatures
- Identify common turbine engine failures

Outcome #2: Identify the principles of turbine engine component operation and their impact on the operation of the aircraft turbine engine and its auxiliary units.

- Understand compressor surge control
- Adjust fuel control devices
- Identify causes of hot spots on combustion casing
- Determine effects of exhaust nozzle adjustments

Outcome #3: Research and Implement a strategy for accurate and timely maintenance of the overhaul of an aircraft turbine engine.

- Utilize manufacturer manuals and FFA directives for turbine engines
- Flag start and stop points throughout overhaul process

Outcome #4: Perform the overhaul of an aircraft turbine engine, implementing the complete inspection of each component for compliance with appropriate regulations and airworthiness standards.

- Understand the operating principles of a turbine engine
- Identify relative gas pressure
- Adjust exhaust cone
- Adjust nozzle diaphragm
- Identify types of combustion chambers

- Remove and replace outer combustion case and liners
- Disassemble compressor sections

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration;
Introduction to Aircraft Maintenance, 3rd Edition, Avotek

Department Notes

Aviation Maintenance Technician Handbook, Federal Aviation Administration;
Introduction to Aircraft Maintenance, 3rd Edition, Avotek

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(541) 506-6000 (tel:5415066000)

Hood River Center
1730 College Way
Hood River, OR 97031-7502

Aviation Maintenance: Powerplant 3

Course Number: AMT 273

Transcript Title: Aviation Maintenance: Powerplant 3

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 272 (/courses/amt-272)

Course Description

Covers reciprocating and turbine engine ignition system theories and overhaul practices, as well as the relationships of the complete ignition system to the powerplant and its operation. Covers proper inspection of the entire engine installation, including exhaust systems, airflow, and cooling systems. Prerequisites: AMT 272. Audit available.

Course Outcomes

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

1. Safely perform aircraft reciprocating and turbine engine ignition system maintenance in accordance with the manufacturer service data, industry practices, and applicable regulations.
2. Inspect and repair engine exhaust systems, including thrust reverser systems.
3. Troubleshoot ignition and starting systems and related engine system discrepancies in accordance with the manufacturer service data, industry practices, and applicable regulations.

4. Identify and repair engine airflow and temperature control malfunctions.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Safely perform aircraft reciprocating and turbine engine ignition system maintenance in accordance with the manufacturer service data, industry practices, and applicable regulations.

- Identify ignition system and related components
- Overhaul magneto and ignition harness
- Measure capacity condenser and effect of incorrect capacity on ignition system

- Locate and utilize data associated with ignition system components
- Adjust spark plug electrodes

Outcome #2: Inspect and repair engine exhaust systems, including thrust reverser systems.

- Inspect and repair heat exchangers and superchargers
- Examine carburetor air intake and induction manifolds
- Apply methods to compensate for the unequal expansion rate of exhaust system
- Address “frozen” ball joints in an exhaust system
- Understand effect of exhaust gas leakage on system components

Outcome #3: Troubleshoot ignition and starting systems and related engine system discrepancies in accordance with the manufacturer service data, industry practices, and applicable regulations.

- Inspect and repair turbine engine electrical starting system
- Service turbine engine pneumatic starting system
- Overhaul magneto and ignition harness
- Measure capacity condenser and effect of incorrect capacity on ignition system
- Determine continuity of ignition wiring
- Practice precautions when working with high-energy ignition systems

Outcome #4: Identify and repair engine airflow and temperature control malfunctions.

- Test engine airflow and temperature control systems
- Identify and repair defective components

- Trouble shoot cause and effect of carburetor and induction system icing
- Apply principles of operation and control of turbo superchargers and integral superchargers
- Repair carburetor air intake and induction manifolds

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

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Hood River Center
1730 College Way
Hood River, OR 97031-7502
Click address for directions/map. (https://maps.google.com/?q=1730%20College%20Way%0D%0AHood%20River%2C%20OR%2097031-7502%0D%0AClick%20address%20for%20directions%2Fmap.)

Aviation Maintenance: Powerplant 4

Course Number: AMT 274

Transcript Title: Aviation Maintenance: Powerplant 4

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 6

Lecture Hours: 0

Lecture / Lab Hours: 132

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 273 (/courses/amt-273)

Course Description

Introduces the many methods of fuel metering used to move air and fuel into and through an engine in a ratio producing safe and efficient engine operation under widely varying conditions. Examines proper inspection of the entire engine installation, including exhaust and lubrication systems, propellers and unducted fans. Prerequisites: AMT 273. Audit available.

Course Outcomes

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

1. Understand and apply the characteristics of aviation fuels, associated fuel systems, fuel metering methods and induction systems relative to engine/airframe installations.
2. Perform maintenance and inspection of fuel system, fuel metering, and induction systems using proper procedures and techniques.
3. Identify and apply all current manufacturer service information, and other airworthiness requirements during the performance of maintenance and inspection

of aircraft fixed and variable pitch propellers.

4. Inspect and service engine lubrication systems.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes and lab work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Understand and apply the characteristics of aviation fuels, associated fuel systems, fuel metering methods and induction systems relative to engine/airframe installations.

- Identify aviation fuels and their properties
- Understand function of fuel metering device

- Inspect, service and repair engine fuel systems
- Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls

Outcome #2: Perform maintenance and inspection of fuel system, fuel metering, and induction systems using proper procedures and techniques.

- Overhaul carburetor
- Repair engine fuel metering system components
- Inspect, service, and repair reciprocating and turbine engine fuel metering systems
- Repair heat exchangers
- Repair turbine engine airflow and temperature control systems

Outcome #3: Identify and apply all current manufacturer service information, and other airworthiness requirements during the performance of maintenance and inspection of aircraft fixed and variable pitch propellers.

- Identify and select propeller lubricants
- Balance propellers
- Install, troubleshoot and remove propellers
- Inspect and troubleshoot unducted fan system components
- Detect and correct vertical and horizontal unbalance in a two-blade propeller
- Determine the direction of rotation and install oil control plugs in governors
- Understand the purpose and function of the parts of a propeller

Outcome #4: Inspect and service engine lubrication systems.

- Identify and select lubricants
- Inspect, service and repair engine lubrication systems
- Apply methods used to prevent excessive oil from accumulating in cylinders of radial engines
- Identify location and function of oil temperature regulator
- Identify factors that affect the oil consumption of a reciprocating engine
- Explain the results of operating an engine using an incorrect lubricant

Suggested Texts and Materials

Aviation Maintenance Technician Handbook, Federal Aviation Administration; Introduction to Aircraft Maintenance, 3rd Edition, Avotek

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(541) 506-6000 (tel:5415066000)

Aviation Maintenance: Powerplant Return to Service

Course Number: AMT 282

Transcript Title: Aviation Maintenance: Powerplant Return to Service

Created: Jul 26, 2022

Updated: Jun 29, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 0

Lab Hours: 90

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

AMT 274 (/courses/amt-274)

Course Description

Provides diversified projects, supervised field experiences and FAA examination review for Powerplant operations. Prerequisite: AMT 274. Audit available.

Course Outcomes

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

1. Utilize the skills that are expected of those entering the aviation maintenance industry as a certified Aircraft Mechanic with an Powerplant rating.
2. Make independent and accurate airworthiness judgments appropriate to Powerplant Subject Area content.
3. When eligible, competently sit for the FAA written, oral and practical certification testing.

Suggested Outcome Assessment Strategies

Evaluations by exams, quizzes, lab and practical work.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Utilize the skills that are expected of those entering the aviation maintenance industry as a certified Aircraft Mechanic with an Powerplant rating.

- Inspect and repair sheet metal structures
- Assemble aircraft component
- Understand hydraulic and pneumatic power systems.
- Identify elements of fuel systems

Outcome #2: Make independent and accurate airworthiness judgments appropriate to Powerplant Subject Area content.

- Perform airframe conformity and airworthiness inspections
- Inspect, adjust, repair, replace, assemble and/or rig aircraft
- Identify manufacturer engine service resources
- Research FAA airworthiness requirements
- Read and interpret service information and airworthiness requirements for application

Outcome #3: When eligible, competently sit for the FAA written, oral and practical certification testing.

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Hood River Center
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Hood River, OR 97031-7502
Click address for directions/map. (https://maps.google.com/?

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Solidworks Mechanical Design Digital Badge	Granting Institution(s)/Agency(s):	Dassault Systems/Solidworks
Course Equivalency:	Course Title(s):	MFG 210	
	Credits:	3	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) Introduces digital design using modern CAD programs in two dimensions and introduces three dimensional drawings. Explores basic dimensioning to Geometric Dimensions and Tolerancing as used in blueprints. Covers multi-view drawings, part and assembly drawings. Prerequisites: MFG 155. Audit available. • Understand digital print layout and formats. – Covered as part of the testing process for this certificate. • Utilize multi-view drawings to create digital blueprints. - Covered as part of the testing process for this certificate. • Create assembly drawings for the fabrication of multi-part assemblies. - Covered as part of the testing process for this certificate. • Generate accurate first and third angle projection of common 3d objects. - Covered as part of the testing process for this certificate. • Use Geometric Tolerancing and Dimensioning to accurately describe parts and assemblies. - Covered as part of the testing process for this certificate.
Other:	All are addressed.

SECTION #3 IMPLEMENTATION	
Implementation term:	☒ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW		
"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."		
Submitter	Email	Date
Robert Wells-Clark	rclark@cgcc.edu	05.02.2024
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director): RWC		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
2. Refer to the curriculum office website for the Curriculum Committee meeting schedule and submission deadlines. You are encouraged to send submissions prior to the deadline so that the curriculum office may review and provide feedback.
3. Course submissions will be placed on the next agenda with available time slots. You will be notified of your submission's time for review, and you will be sent a signature page that may be completed electronically or manually by your department chair and department dean. It is the submitter's responsibility to ensure that completed signature pages are delivered to the Curriculum Office the day before the Curriculum Committee meeting for which the submission is scheduled. Submissions without signed signature pages will be postponed.
4. It is not mandatory that you attend the Curriculum Committee meeting in which your submission is scheduled for review; however, it is strongly encouraged that you attend so that you may represent your submission and respond to any committee questions. Unanswered questions may result in a submission being rescheduled for further clarification.

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Autodesk Professional Design for Manufacturing	Granting Institution(s)/Agency(s):	Autodesk
Course Equivalency:	Course Title(s):	MFG 210	
	Credits:	3	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) Introduces digital design using modern CAD programs in two dimensions and introduces three dimensional drawings. Explores basic dimensioning to Geometric Dimensions and Tolerancing as used in blueprints. Covers multi-view drawings, part and assembly drawings. Prerequisites: MFG 155. Audit available. • Understand digital print layout and formats. – Covered as part of the testing process for this certificate. • Utilize multi-view drawings to create digital blueprints. - Covered as part of the testing process for this certificate. • Create assembly drawings for the fabrication of multi-part assemblies. - Covered as part of the testing process for this certificate. • Generate accurate first and third angle projection of common 3d objects. - Covered as part of the testing process for this certificate. • Use Geometric Tolerancing and Dimensioning to accurately describe parts and assemblies. - Covered as part of the testing process for this certificate.
Other:	All are addressed.

SECTION #3 IMPLEMENTATION	
Implementation term:	☒ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW		
"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."		
Submitter	Email	Date
Robert Wells-Clark	rclark@cgcc.edu	05.02.2024
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director): RWC		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
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Introduction to Computer Aided Design and Tolerancing

Course Number: MFG 210

Transcript Title: Introduction to Computer Aided Design and Tolerancing

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 155 (/courses/mfg-155)

Course Description

Introduces digital design using modern CAD programs in two dimensions and introduces three dimensional drawings. Explores basic dimensioning to Geometric Dimensions and Tolerancing as used in blueprints. Covers multi-view drawings, part and assembly drawings. Prerequisites: MFG 155. Audit available.

Course Outcomes

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

- Understand digital print layout and formats.
- Utilize multi-view drawings to create digital blueprints.
- Create assembly drawings for the fabrication of multi-part assemblies.
- Generate accurate first and third angle projection of common 3d objects.

- Use Geometric Tolerancing and Dimensioning to accurately describe parts and assemblies.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency-based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in-booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.
- In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped

classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Understand digital print layout and formats.

- Know the different components of different types of print layouts and symbols.
- Accurately fill out a blueprint with necessary information for referencing and later use and fabrication.
- Use appropriate symbols to describe the intended finished product.

Outcome #2: Utilize multi-view drawings to create digital blueprints.

- Understand and accurately draw and dimension orthographic projection of top view.
- Understand and accurately draw and dimension orthographic projection of side view.
- Understand and accurately draw and dimension orthographic projection of front view.
- Display knowledge of which view to use, when and how.

Outcome #3: Create assembly drawings for the fabrication of multi-part assemblies.

- Determine appropriate assembly procedure of developed multi-part assembly.
- Draw a complete basic assembly drawing.
- Draw an Exploded View assembly drawing.

Outcome #4: Generate accurate first and third angle projection of common 3d objects.

- Identify the difference between usage and drawing in first and third angle projection.
- Create a first angle projection of a 3d object.
- Create a third angle project of a 3d object.

Outcome #5: Use Geometric Tolerancing and Dimensioning to accurately describe parts and assemblies.

- Understand the symbols specific to GD&T.
- Describe and know the difference between GD&T and regular tolerances.
- Apply GD&T to a existing blueprint to describe necessary tolerances and sizing.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

Suggested/recommended text:

- Print Reading for Welders 5th Edition Thomas E. Proctor, Jonathan F. Gosse

Suggested Resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com
- Amatrol Learning Systems Curriculum

Students utilize on campus computer resources and software, e.g. CAD resources.

Department Notes

Safety glasses are required at all times in the manufacturing lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

CC date _____
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Autodesk Professional Design for Manufacturing	Granting Institution(s)/Agency(s):	Autodesk
Course Equivalency:	Course Title(s):	MFG 211, MFG 212	
	Credits:	6	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) MFG 211: Prepares students for working with and creating three dimensional drawings that are used in manufacturing with CNC equipment. Introduces solid modeling concepts. Prerequisite MFG 210. Audit available. • Create Solid Modeling in 3d CAD software. - Covered as part of the testing process for this certificate. • Utilize extrusion, fillets and chamfers to generate drawings. - Covered as part of the testing process for this certificate. • Understand machining tolerances as they apply to 3d models for manufacturing using machining equipment. - Covered as part of the testing process for this certificate. • Create product from a solid 3d model. - Covered as part of the testing process for this certificate. MFG 212: Covers creating drawings for existing 3 dimensional objects for reproduction. Explores multi-part assemblies and assembly drawings as well as assembly animations and their utilization in lean manufacturing. Continues development of tool use in 3d drafting software and solid modeling skills including application in reproduction of products. Prerequisites: MFG 211. Audit available. • Create digital drawing of existing three-dimensional objects to tolerance. - Covered as part of the testing process for this certificate.

	• Create 3d multi-part assemblies using digital drafting software. - Covered as part of the testing process for this certificate. • Generate exploded assembly views for existing and new 3d blueprints. - Covered as part of the testing process for this certificate. • Generate exploded assembly animation. - Covered as part of the testing process for this certificate. • Produce / replicate existing three-dimensional object to tolerance. - Covered as part of the testing process for this certificate.
Other:	All are addressed.

SECTION #3 IMPLEMENTATION	
Implementation term:	☒ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

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Submitter	Email	Date
Robert Wells-Clark	rclark@cgcc.edu	05.02.2024
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director): RWC		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
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CC date _____
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Columbia Gorge Community College

Credit for Prior Learning (CPL)
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SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Solidworks Mechanical Design Academic Version	Granting Institution(s)/Agency(s):	Dassault Systems / Solidworks
Course Equivalency:	Course Title(s):	MFG 211, MFG 212	
	Credits:	6	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

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Robert Wells-Clark	rclark@cgcc.edu	05.02.2024
Department Chair (enter name of department chair):		
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Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Autodesk Professional Design for Manufacturing	Granting Institution(s)/Agency(s):	Autodesk
Course Equivalency:	Course Title(s):	MFG 211, MFG 212	
	Credits:	6	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

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Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

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SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Autodesk Professional Design for Manufacturing	Granting Institution(s)/Agency(s):	Autodesk
Course Equivalency:	Course Title(s):	MFG 211	
	Credits:	3	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

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Other:	All are addressed.

SECTION #3 IMPLEMENTATION	
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Submitter	Email	Date
Robert Wells-Clark	rclark@cgcc.edu	05.02.2024
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director): RWC		

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CAD Design for CNC Manufacturing 1

Course Number: MFG 211

Transcript Title: CAD Design for CNC Manufacturing 1

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 210 (/courses/mfg-210)

Course Description

Prepares students for working with and creating three dimensional drawings that are used in manufacturing with CNC equipment. Introduces solid modeling concepts. Prerequisite MFG 210. Audit available.

Course Outcomes

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

1. Create Solid Modeling in 3d CAD software.
2. Utilize extrusion, fillets and chamfers to generate drawings.
3. Understand machining tolerances as they apply to 3d models for manufacturing using machining equipment.
4. Create product from a solid 3d model.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency-based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in-booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.
- In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects,

service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Create Solid Modeling in 3d CAD software.

- Understand different tools and concepts used in industry used 3D modeling software.
- Use basic functions to create work within solid modeling software.
- Utilize tools within 3D CAD software to recreate a solid model from a physical part.

Outcome #2: Utilize extrusion, fillets and chamfers to generate drawings.

- Create more complex models using extrusion techniques and fillets and chamfers.
- Generate a completed product drawing including dimensions and fastener holes.
- Simulate machine tool pathing to ensure design is production ready.

Outcome #3: Understand machining tolerances as they apply to 3d models for manufacturing using machining equipment.

- Apply tolerance and GD&T to a solid model.
- Understand different types of tooling for machining and it’s limitations and tolerances as they apply to a solid model.

- Utilize the simulator to verify accuracy of expected GD&T, and veracity of modeling.

Outcome #4: Create product from a solid 3d model.

- Generate a blueprint with 3rd dimensional orthographic projection.
- Create a solid model and simulate production processes in the simulator.
- Fabricate from the solid model to physical product.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

Suggested/recommended text:

- Print Reading for Welders 5th Edition Thomas E. Proctor, Jonathan F. Gosse

Suggested Resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com

- Amatrol Learning Systems Curriculum

Students utilize on campus computer resources and software, e.g. CAD resources.

Department Notes

Safety glasses are required at all times in the manufacturing lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

COLUMBIA GORGE
COMMUNITY COLLEGE

The Dalles Campus
400 East Scenic Drive
The Dalles, OR 97058
Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20
(541) 506-6000 (tel:5415066000)

Hood River Center
1730 College Way
Hood River, OR 97031-7502
Click address for directions/map. (https://maps.google.com/?

COLUMBIA GORGE COMMUNITY COLLEGE

CAD Design for CNC Manufacturing 2

Course Number: MFG 212

Transcript Title: CAD Design for CNC Manufacturing 2

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 211 (/courses/mfg-211)

Course Description

Covers creating drawings for existing 3 dimensional objects for reproduction. Explores multi-part assemblies and assembly drawings as well as assembly animations and their utilization in lean manufacturing. Continues development of tool use in 3d drafting software and solid modeling skills including application in reproduction of products. Prerequisites: MFG 211. Audit available.

Course Outcomes

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

1. Create digital drawing of existing three-dimensional objects to tolerance.
2. Create 3d multi-part assemblies using digital drafting software.
3. Generate exploded assembly views for existing and new 3d blueprints.
4. Generate exploded assembly animation.
5. Produce / replicate existing three-dimensional object to tolerance.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency-based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in-booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.
- In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects,

service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Create digital drawing of existing three-dimensional objects to tolerance.

- Use precision measure tools with accuracy to accurately size drawing.
- Understand the use of digital tool sets and how they interact and relate to physical precision measuring tools.
- Determine which is the correct tool to use for measuring tasks.

Outcome #2: Create 3d multi-part assemblies using digital drafting software.

- Create an assembly that has multiple parts to be created.
- Machine and develop all necessary assembly pieces in house.
- Develop an assembly procedure.

Outcome #3: Generate exploded assembly views.

- Create an exploded assembly view.
- Generate an accurate fastener list.

- Produce an accurate parts list.

Outcome #4: Generate exploded assembly animation.

- Create an exploded assembly animation showing assembly steps and procedures.
- Include created tolerances, expected dimensions and all assembly steps.

Outcome #5: Produce / replicate existing three-dimensional object to tolerance.

- Choose a 3d object to replicate and create a digital drawing.
- Produce the part using available equipment from the drawing created.
- Assemble and check tolerance of created part to drawing.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

Suggested/recommended text:

- Print Reading for Welders 5th Edition Thomas E. Proctor, Jonathan F. Gosse

Suggested Resources:

- AWS Structural Code Book 2020

- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com
- Amatrol Learning Systems Curriculum

Students utilize on campus computer resources and software, e.g. CAD resources.

Department Notes

Safety glasses are required at all times in the manufacturing lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

COLUMBIA GORGE
COMMUNITY COLLEGE

The Dalles Campus
400 East Scenic Drive
The Dalles, OR 97058
Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20(

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, rclark@cgcc.edu
License/Certification Title:	AWS D1.1 4G, SMAW or GMAW Mild Steel, Expired Ok	Granting Institution(s)/Agency(s):	American Welding Society
Course Equivalency:	Course Title(s):	MFG 195, 150, 151	
	Credits:	9	
Potential application to current awards:	• Associate of Applied Science: Advanced Manufacturing and Fabrication • Manufacturing certificate • Advanced Manufacturing Technology certificate		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) MFG 195 Introduces the operation of equipment and tools used in standard welding and manufacturing shops. Identifies procedures, practices and skills used by welders including commonly used welding machines and the equipment used to cut and finish material. Audit available. • Apply welding industry safety standards – Will be known by operator who holds this licensure as these safety standards are required to take the test. • Demonstrate industry standard basic and commonly welded joints and positions – The blueprint for the test procedure requires these skills • Perform SMAW Position 1 and 2, G and F (groove and fillet) joints to apprentice level of welding – These processes are superseded by this licensure and co-awarded. • Perform GMAW/MIG Position 1and2,G and F (groove and fillet) joints to apprentice level of welding - These processes are superseded by this licensure and co-awarded. • Identify tools and equipment used in the welding industry and apply their appropriate use – This would be required to complete the test. • Research welding careers and the requirements of the profession – The test taker will have already had a career in field to need to take this test.

	MFG150 Introduces basic manufacturing processes used in industry. Expands on joints learned in MFG195 to out of position welding joints. Emphasizes weld quality, joint quality and measurement tolerances for welding processes used in industry. Introduces additional tools used in welding trades. Prerequisite/concurrent: MFG 195. Audit available. • Demonstrate knowledge of intermediate and advanced welding joints- This would be required to set up the plate for taking the test. • Identify and diagnose common weld errors and their corrections – This is covered by the test. • Perform SMAW position 3 G and F welds to an apprentice level of welding – This is covered by the test. • Perform GMAW position 3 G and F welds to an apprentice level of welding – This is covered by the Test • Create and weld appropriate joints for common manufacturing processes – This skill is required to set up the test. • Identify and precisely use commonly used manufacturing tooling – This is required to prepare the plate for the test, and process the plate for bending after the weldment part of the test is take. MFG 151 Builds on fabrication principles started in MFG 150 and adds Pos 4 welding on mild steel in groove and fillet fitments. Focuses on scientific principles that effect weld outcomes and how those principles can be used by welders to ensure quality weld and fabrication outcomes. Teaches use of Oxy-Fuel cutting equipment. Prerequisites: MFG 150. Audit available. • Create Position 4 Fillet weldments using SMAW and GMAW processes for destructive testing as per AWS D1.1 code. – This is covered by the test. • Create Position 4 Groove weldments using SMAW and GMAW processes for destructive testing as per AWS D1.1 code. – This is covered by the test. • Accurately account for welding warp in mild steel processes. – This is required to pass the test. • Demonstrate knowledge of heat affected zone chemistry and its practical considerations in welding. – This is demonstrated by passing the test. • Use Oxygen-Fuel cutting techniques to process and handle materials in a fabrication environment. – This is used to prepare plates for the test. • Apply the technical skills and math needed to carry out correct joint preparation and fit-up. – This is demonstrated through the cutting of angles and setup of the plate accurately to take the test, and is inspected prior to the test being welded.
Other:	(List any course requirements that may exist beyond learning outcomes. Describe how the licensure/certification ensures that the requirement is addressed/fulfilled. For example, if the course requires a specific # of clinical hours, include licensure/certification requirements that show that the hours required have been fulfilled/addressed. Course requisite requirements are not applicable to licensure/certification CPL approval.)

SECTION #3 IMPLEMENTATION	
Implementation term:	☐ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW		
"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."		
Submitter	Email	Date
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
2. Refer to the curriculum office website for the Curriculum Committee meeting schedule and submission deadlines. You are encouraged to send submissions prior to the deadline so that the curriculum office may review and provide feedback.
3. Course submissions will be placed on the next agenda with available time slots. You will be notified of your submission's time for review, and you will be sent a signature page that may be completed electronically or manually by your department chair and department dean. It is the submitter's responsibility to ensure that completed signature pages are delivered to the Curriculum Office the day before the Curriculum Committee meeting for which the submission is scheduled. Submissions without signed signature pages will be postponed.
4. It is not mandatory that you attend the Curriculum Committee meeting in which your submission is scheduled for review; however, it is strongly encouraged that you attend so that you may represent your submission and respond to any committee questions. Unanswered questions may result in a submission being rescheduled for further clarification.

CC date 5-9-24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, rclark@cgcc.edu
License/Certification Title:	AWS D1.1 3G GMAW or SMAW Mild Steel, Expired Ok	Granting Institution(s)/Agency(s):	American Welding Society
Course Equivalency:	Course Title(s):	MFG 195, MFG150	
	Credits:	6	
Potential application to current awards:	• Associate of Applied Science: Advanced Manufacturing and Fabrication • Manufacturing certificate • Advanced Manufacturing Technology certificate		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) MFG 195 Introduces the operation of equipment and tools used in standard welding and manufacturing shops. Identifies procedures, practices and skills used by welders including commonly used welding machines and the equipment used to cut and finish material. Audit available. • Apply welding industry safety standards – Will be known by operator who holds this licensure as these safety standards are required to take the test. • Demonstrate industry standard basic and commonly welded joints and positions – The blueprint for the test procedure requires these skills • Perform SMAW Position 1 and 2, G and F (groove and fillet) joints to apprentice level of welding – These processes are superseded by this licensure and co-awarded. • Perform GMAW/MIG Position 1and2,G and F (groove and fillet) joints to apprentice level of welding - These processes are superseded by this licensure and co-awarded. • Identify tools and equipment used in the welding industry and apply their appropriate use – This would be required to complete the test. • Research welding careers and the requirements of the profession – The test taker will have already had a career in field to need to take this test. MFG150 Introduces basic manufacturing processes used in industry. Expands on joints learned in MFG195 to out of position welding joints. Emphasizes weld quality,

	joint quality and measurement tolerances for welding processes used in industry. Introduces additional tools used in welding trades. Prerequisite/concurrent: MFG 195. Audit available. • Demonstrate knowledge of intermediate and advanced welding joints- This would be required to set up the plate for taking the test. • Identify and diagnose common weld errors and their corrections – This is covered by the test. • Perform SMAW position 3 G and F welds to an apprentice level of welding – This is covered by the test. • Perform GMAW position 3 G and F welds to an apprentice level of welding – This is covered by the Test • Create and weld appropriate joints for common manufacturing processes – This skill is required to set up the test. • Identify and precisely use commonly used manufacturing tooling – This is required to prepare the plate for the test, and process the plate for bending after the weldment part of the test is take.
Other:	(List any course requirements that may exist beyond learning outcomes. Describe how the licensure/certification ensures that the requirement is addressed/fulfilled. For example, if the course requires a specific # of clinical hours, include licensure/certification requirements that show that the hours required have been fulfilled/addressed. Course requisite requirements are not applicable to licensure/certification CPL approval.)

SECTION #3 IMPLEMENTATION	
Implementation term:	☐ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
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Submitter	Email	Date
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark / rclark@cgcc.edu
License/Certification Title:	D1.2G SMAW, GMAW Mild Steel, Expired ok	Granting Institution(s)/Agency(s):	American Welding Society
Course Equivalency:	Course Title(s):	MFG 195	
	Credits:	3	
Potential application to current awards:	• Associate of Applied Science: Advanced Manufacturing and Fabrication • Manufacturing certificate • Advanced Manufacturing Technology certificate		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
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Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
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Manufacturing Processes

Course Number: MFG 150

Transcript Title: Manufacturing Processes

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

Prerequisite / Concurrent

MFG 195 (/courses/mfg-195)

Course Description

Introduces basic manufacturing processes used in industry. Expands on joints learned in MFG195 to out of position welding joints. Emphasizes weld quality, joint quality and measurement tolerances for welding processes used in industry. Introduces additional tools used in welding trades. Prerequisite/concurrent: MFG 195. Audit available.

Course Outcomes

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

1. Demonstrate knowledge of intermediate and advanced welding joints
2. Identify and diagnose common weld errors and their corrections
3. Perform SMAW position 3 G and F welds to an apprentice level of welding
4. Perform GMAW position 3 G and F welds to an apprentice level of welding
5. Create and weld appropriate joints for common manufacturing processes
6. Identify and precisely use commonly used manufacturing tooling

Suggested Outcome Assessment Strategies

Assessment for this course is based upon destructive and visual testing of the intermediate weld joints produced by students. Students must identify the cause of these weld errors and correct them to industry specification. Assessments are a mix of quizzes and visual inspections of previous welds, as well as diagnosis of their own and their classmates welds. Projects created by students will be checked to specification and tolerance according to industry standard including pre-inspection before welding to check joint fit up quality. A rubric including tolerances will be used to assign a value to each assessment.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Demonstrate knowledge of intermediate and advanced welding joints

- Read and understand technical documents pertaining to weld joint design
- Determine the correct process for welding intermediate and advanced welding joints
- Understand how to differentiate contour, type and quality

Outcome #2: Identify and diagnose common weld errors and their corrections

- Make corrective action based on visual feedback from welds
- Determine weld error from destructive testing procedure and correct
- Cut and etch welds and make a determination of overall quality
- Understand weld heat affected zone and corrections
- Determine necessary corrections for warp prior to welding.

Outcome #3: Perform SMAW position 3 G and F welds to an apprentice level of welding

- Weld in SMAW 3G and 3F to AWS Code
- Participate in mock destructive testing

Outcome #4: Perform GMAW position 3 G and F welds to an apprentice level of welding

- Weld in GMAW 3G and 3F to AWS Code
- Participate in mock destructive testing

Outcome #5: Create and weld appropriate joints for common manufacturing processes

- Prepare and fit joints using tools typically used in the welding industry to tolerance
- Correctly prepare mock AWS testing plates
- Use basic measuring tools to compare joint fitment to tolerance/allowance

Outcome #6: Identify and precisely use commonly used manufacturing tooling

- Complete basic fabrications using common and basic industry tooling
- Use math to determine necessary angles, lengths and placement of cuts and bends
- Create right angle to tolerance using available manufacturing tooling.

Suggested Texts and Materials

Some Suggested resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com

Suggested Text:

- Welding Skills 5th Edition; B.J. Moniz

Department Notes

Safety glasses are required at all times in the welding lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, etc.). Safety requirements are covered prior to work in the lab.

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400 East Scenic Drive
The Dalles, OR 97058
Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20
(541) 506-6000 (tel:5415066000)

Hood River Center
1730 College Way
Hood River, OR 97031-7502
Click address for directions/map. (https://maps.google.com/?

Fabrication Processes 1

Course Number: MFG 151

Transcript Title: Fabrication Processes 1

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 150 (/courses/mfg-150)

Course Description

Builds on fabrication principles started in MFG 150 and adds Pos 4 welding on mild steel in groove and fillet fitments. Focuses on scientific principles that effect weld outcomes and how those principles can be used by welders to ensure quality weld and fabrication outcomes. Teaches use of Oxy-Fuel cutting equipment. Prerequisites: MFG 150. Audit available.

Course Outcomes

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

1. Create Position 4 Fillet weldments using SMAW and GMAW processes for destructive testing as per AWS D1.1 code.
2. Create Position 4 Groove weldments using SMAW and GMAW processes for destructive testing as per AWS D1.1 code.
3. Accurately account for welding warp in mild steel processes.
4. Demonstrate knowledge of heat affected zone chemistry and its practical considerations in welding.
5. Use Oxygen-Fuel cutting techniques to process and handle materials in a fabrication environment.

6. Apply the technicalskills and math needed to carry out correct joint preparation and fit-up.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.
- In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped

classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Create Position 4 Fillet weldments using SMAW and GMAW processes for destructive testing as per AWS D1.1 code.

- Understand American Welding Society (AWS) D1.1 structural code for SMAW 7018 fillet weld process in position 4.
- Prepare plate for welding according to structural standard.
- Weld plate to code specification.
- Prepare plate for destructive testing per AWS Code.
- Interpret destructive testing results.

Outcome #2: Create Position 4 Groove weldments using SMAW and GMAW processes for destructive testing as per AWS D1.1 code.

- Understand American Welding Society (AWS) D1.1 structural code for SMAW 7018 groove weld process in position 4.
- Prepare plate for welding according to structural.
- Weld plate to code specification.
- Prepare plate for destructive testing per AWS Code.

- Interpret destructive testing results.

Outcome #3: Accurately account for welding warp in mild steel processes.

- Define and predict using a formula the amount of warp an assembly will experience based on the expected heat input.
- Create basic tacked together assemblies with warp tolerances pre-accounted for.
- Manufacture and finish assemblies and use quality control best practices to ensure tolerances are met post welding.

Outcome #4: Demonstrate knowledge of heat affected zone chemistry and its practical considerations in welding and fabrication.

- Understand the chemical changes that occur within the heat effected zone and the resulting change in material structure.
- Define the different zones within the heat affected zone and how they are chemically and physically different from the welded zone and base material.
- Understand mitigation strategies for reducing heat affected zone size and fatigue in mild steel.
- Prepare and implement heat affected zone mitigation strategies.

Outcome #5: Use Oxygen-Fuel cutting techniques to process and handle materials in a fabrication environment.

- Understand Oxygen-Fuel cylinder safety and handling procedures.
- Demonstrate proper Oxy-Fuel cutting torch setup and shut down.

- Produce industry standard cuts in material up to 1” thick using appropriate cutting torch size and setup.
- Determine gas flow necessary for appropriate cutting torch operation.
- Understand practical and procedural differences in different types of fuel gasses commonly used in torch cutting.
- Demonstrate basic torch maintenance and upkeep procedures.

Outcome #6: Apply the technical skills and math needed to carry out correct joint preparation and fitup.

- Use circumference math and tube sizing formula to calculate the amount of tube needed to make bent product.
- Calculate angles of triangles and length of triangles in assemblies to accurately determine length of materials needed for projects.
- Accurately calculate material amount needed for large scale project from blueprints and cost material using online resources.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

The following books are recommended:

- Welding Skills, 5th Edition, B.J. Moniz

- Welding Skills Workbook, 5th Edition, Jonathan F. Gosse
- Print Reading for Welders, 5th Edition, Thomas E. Proctor, Jonathan F. Goss

Some Suggested resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com

Department Notes

Safety glasses are required at all times in the welding lab and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

COLUMBIA GORGE COMMUNITY COLLEGE

Welding Technology I

Course Number: MFG 195

Transcript Title: Welding Technology I

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Course Description

Introduces the operation of equipment and tools used in standard welding and manufacturing shops. Identifies procedures, practices and skills used by welders including commonly used welding machines and the equipment used to cut and finish material. Audit available.

Course Outcomes

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

1. Apply welding industry safety standards
2. Demonstrate industry standard basic and commonly welded joints and positions
3. Perform SMAW Position 1 and 2, G and F (groove and fillet) joints to apprentice level of welding
4. Perform GMAW/MIG Position 1and2,G and F (groove and fillet) joints to apprentice level of welding
5. Identify tools and equipment used in the welding industry and apply their appropriate use
6. Research welding careers and the requirements of the profession

Suggested Outcome Assessment Strategies

Assessment will be based upon written examinations for safety and basic welding practice prior to working in the lab, basic tool quizzes after introduction and use, and weld sample inspection / destructive weld sample testing for all SMAW/GMAW welds. An exploratory career research report will be written for the student to better understand potential careers in the field.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Apply welding industry safety standards

- Demonstrate appropriate PPE useage
- Safely use common tools in the welding shop
- Display knowledge of environmental hazards in the welding lab

Outcome #2: Demonstrate industry standard basic and commonly welded joints and positions

- Identify lap, groove, butt, plug, slot, corner, edge and fillet joints
- Create lap, groove, butt, plug, slot, corner, edge and fillet joints

Outcome #3: Perform SMAW Position 1 and 2, G and F (groove and fillet) joints to apprentice level of welding

- Pass a SMAW mock certification in Position 1G and 2G
- Pass a SMAW destructive test in Position 1F and 2F.

Outcome #4: Perform GMAW/MIG Position 1and 2,G and F (groove and fillet) joints to apprentice level of welding

- Pass a GMAW mock certification in Position 1G and 2G
- Pass a GMAW destructive test in Position 1F and 2F.

Outcome #5: Identify tools and equipment used in the welding industry and apply their appropriate use

- Identify different commonly used welding shop tools
- Demonstrate efficient and affective use of commonly used welding shop tools
- Determine the appropriate tooling for a task based upon a problem solving based approach

Outcome #6: Research welding careers and the requirements of the profession

- Consider different career options within welding and manufacturing fields
- Determine which careers may be the best choice for you, and articulate why
- Listen and understand from primary sources what different careers in the manufacturing spectrum entail

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

Some Suggested resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com

The following books are recommended:

- Welding Skills 5th Edition B.J. Moniz
- Welding Skills Workbook 5th Edition Jonathan F. Gosse

Department Notes

Safety glasses are required at all times in the welding lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, etc.). Safety requirements are covered prior to work in the lab.

COLUMBIA GORGE
COMMUNITY COLLEGE

The Dalles Campus
400 East Scenic Drive
The Dalles, OR 97058
Click address for directions/map. (https://maps.google.com/?q=400%20East%20Scenic%20Drive%0D%0AThe%20Dalles%2C%20(
(541) 506-6000 (tel:5415066000)

Hood River Center
1730 College Way
Hood River, OR 97031-7502
Click address for directions/map. (https://maps.google.com/?q=1730%20College%20Way%0D%0AHood%20River%2C%20OR%2097031-7502%0D%0AClick%20address%20for%20directions%2Fmap.)

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	CAM for 2.5 Axis Milling	Granting Institution(s)/Agency(s):	Autodesk
Course Equivalency:	Course Title(s):	MFG 220	
	Credits:	3	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) Introduces use of whole shop production methods for producing parts and assemblies. Describes the use of math and lean manufacturing principles to streamline production and prototyping in the industrial environment. Prerequisites: MFG 157. Audit available. • Produce complex products from scratch fully utilizing shop equipment. – Covered as part of the testing process for this certificate. • Understand lean manufacturing principles. – Covered as part of the testing proess for this certificate. • Develop labor and cost estimating strategies based on prevailing wage. – Covered as part of the testing process for this certificate. • Explore machining processes for production fabrication. – Covered as part of the testing process for this certificate.
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SECTION #3 IMPLEMENTATION	
Implementation term:	☐ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW		
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Submitter	Email	Date
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
2. Refer to the curriculum office website for the Curriculum Committee meeting schedule and submission deadlines. You are encouraged to send submissions prior to the deadline so that the curriculum office may review and provide feedback.
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CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Haas Basic Mill	Granting Institution(s)/Agency(s):	Haas Automation
Course Equivalency:	Course Title(s):	MFG 220	
	Credits:	3	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

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Department Dean/Director (enter name of department dean/director):		

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CC date 5.9.24
CC decision _____
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Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Mastercam 2D Mill	Granting Institution(s)/Agency(s):	Mastercam
Course Equivalency:	Course Title(s):	MFG 220	
	Credits:	3	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

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Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

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COLUMBIA GORGE COMMUNITY COLLEGE

Production Manufacturing 1

Course Number: MFG 220

Transcript Title: Production Manufacturing 1

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 157 (/courses/mfg-157)

Course Description

Introduces use of whole shop production methods for producing parts and assemblies. Describes the use of math and lean manufacturing principles to streamline production and prototyping in the industrial environment. Prerequisites: MFG 157. Audit available.

Course Outcomes

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

1. Produce complex products from scratch fully utilizing shop equipment.
2. Understand lean manufacturing principles.
3. Develop labor and cost estimating strategies based on prevailing wage.
4. Explore machining processes for production fabrication.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency-based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in-booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.
- In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects,

service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Produce complex products from scratch utilizing shop equipment.

- Create a blueprint and assembly drawing.
- Produce products to tolerance and test, redesign from blueprint if necessary using CNC and manual equipment.
- Develop process and procedure sheets for blueprints.

Outcome #2: Understand lean manufacturing principles.

- Demonstrate knowledge of several lean manufacturing systems.
- Compare and contrast different lean manufacturing designs and their applicable implementation in an industrial environment.

Outcome #3: Develop labor and cost estimating strategies based on prevailing wage.

- Determine prevailing wage of different aspects of a producing a product.
- Create a labor cost estimate broken down by different techniques used.

- Identify any potential cost savings through efficiency in wage labor.

Outcome #4: Explore machining processes for production fabrication.

- Understand machining tools and processes.
- Identify different toolsets and their usage.
- Explore efficiency comparing manual machining and CNC machining.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

Suggested/recommended text:

- Print Reading for Welders 5th Edition Thomas E. Proctor, Jonathan F. Gosse

Suggested Resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com

- Amatrol Learning Systems Curriculum

Students utilize on campus computer resources and software, e.g. CAD resources.

Department Notes

Safety glasses are required at all times in the manufacturing lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

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(541) 506-6000 (tel:5415066000)

Hood River Center
1730 College Way
Hood River, OR 97031-7502
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CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Autodesk Certified Professional in CAM for 3 Axis Milling	Granting Institution(s)/Agency(s):	Autodesk
Course Equivalency:	Course Title(s):	MFG 221, 222	
	Credits:	6	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) MFG 221 Explores CNC operations processes and their role in creating a product from Solid 3d modeling. Utilizes numerous systems of control and manufacturing processes to create streamlined research and development and rapid prototype products for testing. Prerequisite MFG 220. Audit available. • Understand CNC operation and programming. – Covered as part of the testing process for this certificate. • Demonstrate knowledge of feed speed and circular interpolation. – Covered as part of the testing process for this certificate. • Produce product from existing 3d solid model and tolerance. – Covered as part of the testing process for this certificate. • Create and assemble multi-part assemblies produced from CNC equipment. – Covered as part of the testing process for this certificate. MFG222 Combines the use of CNC technology and other metalworking and welding techniques to create a simulated production fabrication environment from design to prototype. Utilizes numerous integrated math and technology aspects to accurately produce products. Explores manufacturing problem solving and critical thinking. Prerequisites: MFG 221. Audit available. • Design a blueprint and assembly drawing of a product that requires a fabrication solution. – Covered as part of the testing process for this certificate.

	• Create a prototype from blueprint and do real world testing to check design. – Covered as part of the testing process for this certificate. • Fabricate a product that is production ready. – Covered as part of the testing process for this certificate. • Produce a fixture for production fabrication utilizing lean practices and CNC machining efficiency. – Covered as part of the testing process for this certificate. • Run a production run of a product. – Covered as part of the testing process for this certificate.
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SECTION #3 IMPLEMENTATION	
Implementation term:	☐ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
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Submitter	Email	Date
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
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CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark, Chris Dodson rclark@cgcc.edu, cdodson@cgcc.edu
License/Certification Title:	Mastercam 3D Mill	Granting Institution(s)/Agency(s):	Mastercam
Course Equivalency:	Course Title(s):	MFG 221, 222	
	Credits:	6	
Potential application to current awards:	Associate of Applied Science: Advanced Manufacturing and Fabrication		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
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Department Dean/Director (enter name of department dean/director):		

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Production Manufacturing 2

Course Number: MFG 221

Transcript Title: Production Manufacturing 2

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 220 (/courses/mfg-220)

Course Description

Explores CNC operations processes and their role in creating a product from solid 3d modeling. Utilizes numerous systems of control and manufacturing processes to create streamlined research and development and rapid prototype products for testing. Prerequisite MFG 220. Audit available.

Course Outcomes

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

1. Understand CNC operation and programming.
2. Demonstrate knowledge of feed speed and circular interpolation.
3. Produce product from existing 3d solid model and tolerance.
4. Create and assemble multi-part assemblies produced from CNC equipment.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency-based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in-booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.
- In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects,

service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Understand CNC Operation and Programming.

- Demonstrate knowledge of G-code and write a basic machining process.
- Understand protocols of different commonly used CNC command programs.
- Understand different types of line code and their usage.

Outcome #2: Demonstrate knowledge of feed speed and circular interpolation.

- Program code that runs safely in the simulator.
- Demonstrate ability to optimize code and feed/run speed.
- Use circular interpolation strategies to minimize machining time.

Outcome #3: Produce product from existing 3d solid model and tolerance.

- Take an existing 3d model and apply tool pathing to it for use in a CNC.
- Ensure pathing runs correctly in simulator.
- Run code and tolerance product outcome.

Outcome #4: Create and assemble multi-part assemblies produced from CNC equipment.

- Create a multi-part assembly using CNC machining processes.
- Fabricate to specification of existing blueprint following CNC machine, to correct tolerances and using assembly drawing.

Outcome #5: Identify different CNC tooling.

- Demonstrate knowledge of different types of CNC tooling.
- Identify the job of different tooling and how to use that tooling efficiently.
- Explore safety requirements of different types of tooling.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

Suggested/recommended text:

- Print Reading for Welders 5th Edition Thomas E. Proctor, Jonathan F. Gosse

Suggested Resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com

- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com
- Amatrol Learning Systems Curriculum

Students utilize on campus computer resources and software, e.g. CAD resources.

Department Notes

Safety glasses are required at all times in the manufacturing lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

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Production Manufacturing 3

Course Number: MFG 222

Transcript Title: Production Manufacturing 3

Created: Aug 11, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 221 (/courses/mfg-221)

Course Description

Combines the use of CNC technology and other metalworking and welding techniques to create a simulated production fabrication environment from design to prototype. Utilizes numerous integrated math and technology aspects to accurately produce products. Explores manufacturing problem solving and critical thinking. Prerequisites: MFG 221. Audit available.

Course Outcomes

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

1. Design a blueprint and assembly drawing of a product that requires a full fabrication solution.
2. Create a prototype from blueprint and do real world testing to check design.
3. Fabricate a product that is production ready.
4. Produce a fixture for production fabrication utilizing lean practices and CNC machining efficiency.
5. Run a production run of a product.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency-based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in-booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.
- In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects,

service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Design a blueprint and assembly drawing of a product that requires a full fabrication solution.

- Create a research and development process to determine a needed product.
- Draw and create the solution using solid 3d modeling.
- Describe the fabrication and assembly process of the product; which must include a full fabrication process involving CNC, welding and other.

Outcome #2: Create a prototype from blueprint and do real world testing to check design.

- From the working model, produce a first production prototype.
- Check the prototype for tolerance and design error.
- Test prototype in real word work, collect any necessary data and make any changes.

Outcome #3: Fabricate a finalized product that is production ready.

- Create an efficient and material minimized fabrication process.
- Check final design adjustments for viability.

- Apply lean manufacturing principles to the fabrication process to utilize labor efficiently.

Outcome #4: Produce a fixture for production fabrication utilizing lean practices and CNC machining efficiency practices.

- Write a process and procedure sheet that utilizes a fixture.
- Create a fixture that speeds fabrication process.
- Utilize a fixture that enhances lean manufacturing principles.

Outcome #5: Run a single production run of a product.

- Produce multiple of the same product utilizing production aids.
- Check a production run for tolerance and similarity.
- Develop a marketing campaign for the product.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

Suggested/recommended text:

- Print Reading for Welders 5th Edition Thomas E. Proctor, Jonathan F. Gosse

Suggested Resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com
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Students utilize on campus computer resources and software, e.g. CAD resources.

Department Notes

Safety glasses are required at all times in the manufacturing lab, and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark / rclark@cgcc.edu
License/Certification Title:	AWS D1.2 2G GTAW Aluminum, Expired OK	Granting Institution(s)/Agency(s):	American Welding Society
Course Equivalency:	Course Title(s):	MFG 281	
	Credits:	3	
Potential application to current awards:	• Associate of Applied Science: Advanced Manufacturing and Fabrication • Manufacturing certificate • Advanced Manufacturing Technology certificate		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) Builds on the knowledge of MFG 280 by beginning structural code welding practice and deepening knowledge of GTAW AC processes as they pertain to welding aluminum and alloys. Provides experience creating multipart assemblies as in a production manufacturing environment. Corequisites: MFG 280. Audit available. • Create Position 2 Fillet weldments using AC GTAW processes suitable for destructive testing as per AWS D1.2 code. – Superseded by the test required for this certification. • Create Position 2 Groove weldments using AC GTAW processes suitable for destructive testing as per AWS D1.2 code. – This is the same as the above test for certification. • Identify and recognize the oxidation processes of aluminum components as they pertain to weld quality. – Without this knowledge, the welder would not be able to pass the certification test. • Identify common GTAW AC weld errors and their corrections. – This is proven by holding the certification. • Demonstrate knowledge of procedural changes needed for welding different alloys of aluminum. – This is required knowledge to pass the test. • Create multi-part assemblies from aluminum components with attention to tolerance and appropriate interpretation of a weld process sheet (WPS). – The test is a multi-part assembly with 1/32” tolerance, and includes a WPS.

Other:	(List any course requirements that may exist beyond learning outcomes. Describe how the licensure/certification ensures that the requirement is addressed/fulfilled. For example, if the course requires a specific # of clinical hours, include licensure/certification requirements that show that the hours required have been fulfilled/addressed. Course requisite requirements are not applicable to licensure/certification CPL approval.)

SECTION #3 IMPLEMENTATION	
Implementation term:	☐ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

SECTION #4 DEPARTMENT REVIEW

"I vouch that this submission has been reviewed by the affiliated department chair and department dean and that they have given initial authorization for this submission. I am requesting that it be placed on the next Curriculum Committee agenda with available time slots. I understand that I am required to complete and submit, prior to the day my submission is reviewed by the Curriculum Committee, a Course Signature Form signed by the department chair and dean/director."

Submitter	Email	Date
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
2. Refer to the curriculum office website for the Curriculum Committee meeting schedule and submission deadlines. You are encouraged to send submissions prior to the deadline so that the curriculum office may review and provide feedback.
3. Course submissions will be placed on the next agenda with available time slots. You will be notified of your submission's time for review, and you will be sent a signature page that may be completed electronically or manually by your department chair and department dean. It is the submitter's responsibility to ensure that completed signature pages are delivered to the Curriculum Office the day before the Curriculum Committee meeting for which the submission is scheduled. Submissions without signed signature pages will be postponed.
4. It is not mandatory that you attend the Curriculum Committee meeting in which your submission is scheduled for review; however, it is strongly encouraged that you attend so that you may represent your submission and respond to any committee questions. Unanswered questions may result in a submission being rescheduled for further clarification.

Aluminum GTAW/TIG Fabrication Process 1

Course Number: MFG 281

Transcript Title: Aluminum GTAW/TIG Fabrication Process 1

Created: Aug 15, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 280 (/courses/mfg-280)

Course Description

Builds on the knowledge of MFG 280 by beginning structural code welding practice and deepening knowledge of GTAW AC processes as they pertain to welding aluminum and alloys. Provides experience creating multipart assemblies as in a production manufacturing environment. Corequisites: MFG 280. Audit available.

Course Outcomes

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

1. Create Position 2 Fillet weldments using AC GTAW processes suitable for destructive testing as per AWS D1.2 code.
2. Create Position 2 Groove weldments using AC GTAW processes suitable for destructive testing as per AWS D1.2 code.
3. Identify and recognize the oxidation processes of aluminum components as they pertain to weld quality.
4. Identify common GTAW AC weld errors and their corrections.

5. Demonstrate knowledge of procedural changes needed for welding different alloys of aluminum.
6. Create multi-part assemblies from aluminum components with attention to tolerance and appropriate interpretation of a weld process sheet (WPS).

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency based assessment in an environment that rewards demonstration of skill needed for success in industry.

1. Lecture and in booth coaching and direct instruction.
2. Direct instruction in full class demonstration of skills.
3. Written exams.
4. Student proficiency through demonstration of learned strategies and skills in industry standard environment.
5. Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
6. Job readiness based on performance.
7. In class lab experiments and testing using the scientific process with written result reporting.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Create Position 2 Fillet weldments using AC GTAW processes suitable for destructive testing as per AWS D1.2 code.

- Understand American Welding Society (AWS) D1.2 structural code for aluminum GTAW fillet weld process in position 2.
- Prepare plate for welding according to structural standard.
- Weld plate to code specification.
- Prepare plate for destructive testing per AWS Code.
- Interpret destructive testing results.

Outcome #2: Create Position 2 Groove weldments using AC GTAW processes suitable for destructive testing as per AWS D1.2 code.

- Understand American Welding Society (AWS) D1.2 structural code for aluminum GTAW groove weld process in position 2.
- Prepare plate for welding according to structural standard.
- Weld plate to code specification.
- Prepare plate for destructive testing per AWS Code.
- Interpret destructive testing results.

Outcome #3: Identify and recognize the oxidation processes of aluminum components as they pertain to weld quality.

- Understand the chemical changes / reactions that happen when aluminum is exposed to oxygen in the air.
- Show understanding of appropriate cleanup and prep procedures based on type and extensiveness of oxidation formation on aluminum.
- Identify mechanical and chemical processes used to both prevent oxidation of different aluminum alloys and to clean up existing oxidation on aluminum surfaces.
- Recreate chemical reactions that cause oxidation, and reverse those oxidation reactions.

Outcome #4: Identify common GTAW AC weld errors and their corrections

- Look at different welds and identify problems in procedure, practice or weldment that have created poor weld quality.
- Find problems in weldment using destructive testing and determine cause.
- Using rubric, grade weld quality of peer's work in position 2 fillet and groove weldments, and recommend corrective actions to improve weld quality.

- Find problems in commercially available welded product and produce a corrective action report as a weld engineer or inspector would.

Outcome #5: Demonstrate knowledge of procedural changes needed for welding different alloys of aluminum.

- Demonstrate knowledge of different frequencies and AC balance to use for welding of 6061 aluminum alloy.
- Demonstrate knowledge of different frequencies and AC balance to use for welding 5052 aluminum alloy.
- Identify oxidation correction changes between 5000 series aluminum alloys and 6000 series aluminum alloys.
- Understand necessary procedural changes to avoid centerline cracking in 5000 series aluminum alloys.
- Identify oxidation correction procedures and pre-weldment treatment procedures for cast aluminum weldments.
- Understand procedural differences and best practices for welding “dirty” cast aluminum.

Outcome #6: Create multi-part assemblies from aluminum components with attention to tolerance and appropriate interpretation of a weld procedure specification (WPS).

- Demonstrate aluminum specific design processes in creation of a fabricated multi-part assembly
- Identify possible problems in the assembly and manufacturing of multi-part assemblies as they pertain to GTAW AC aluminum.

- Create a mock weld procedure specification (WPS) for a multi-part assembly, correctly identifying procedures for removal of oxidation and weldment prep and process preparation.
- Assemble to tolerance an aluminum multi-part assembly.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

The following books are recommended:

- Welding Skills, 5th Edition, B.J. Moniz
- Welding Skills Workbook, 5th Edition, Jonathan F. Gosse

Some Suggested resources:

- AWS Structural Code Book 2020
- Aeorspacewelding.com
- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com

Department Notes

Safety glasses are required at all times in the welding lab and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times. Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.). Safety requirements are covered prior to work in the lab.

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(541) 506-6000 (tel:5415066000)

CC date 5.9.24
CC decision _____
CC vote _____

Columbia Gorge Community College

Credit for Prior Learning (CPL)
Acceptance of Licensure/Certification Request

(Double click on check boxes to activate dialog box)

SECTION #1 GENERAL INFORMATION			
Department:	AMF	Submitter name: phone: email:	Robert Wells-Clark / rclark@cgcc.edu
License/Certification Title:	D1.6 GTAW 2G Stainless Steel, Expired Ok	Granting Institution(s)/Agency(s):	American Welding Society
Course Equivalency:	Course Title(s):	MFG285	
	Credits:	3	
Potential application to current awards:	• Associate of Applied Science: Advanced Manufacturing and Fabrication • Manufacturing certificate • Advanced Manufacturing Technology certificate		

SECTION #2 OUTCOMES AND CONTENT ALIGNMENT	
Alignment of Licensure/Certification requirements to course outcomes:	(Enter course description and list all course outcomes [by each course if more than one course] and provide a bulleted outline for each outcome showing how licensure/certification requirements address/fulfill those outcomes.) Builds on the skills learned in MFG 285 by introducing welding to AWS code for stainless steel alloys. Introduces fabrication of stainless steel assemblies and the different procedural and prep changes for different stainless steel alloys. Presents AWS tolerances in color and purity in stainless steel welding, and experiments with a range of outcomes and how they differ both practically and chemically. Prerequisites: MFG 285. Audit available. • Create Position 2 Fillet weldments using DC GTAW processes suitable for destructive testing as per AWS D1.6 code. – Superseded by the test required for this certification. • Create Position 2 Groove weldments using DC GTAW processes suitable for destructive testing as per AWS D1.6 code. - This is the same as the above test for certification. • Manufacture stainless steel multi-part assemblies. – The test assembled by the welder is a multi-part assembly. • Identify weld errors in stainless steel DC GTAW welding and necessary corrections. – This knowledge is demonstrated by holding the certification. • Recognize and explain changes in procedure when dealing with different stainless steel alloys. – This knowledge is demonstrated by holding the certification. • Demonstrate knowledge of AWS acceptable color and surface tolerances and the procedural relationship of those colors and surfaces to process.- This knowledge is demonstrated by holding the certification.

Other:	(List any course requirements that may exist beyond learning outcomes. Describe how the licensure/certification ensures that the requirement is addressed/fulfilled. For example, if the course requires a specific # of clinical hours, include licensure/certification requirements that show that the hours required have been fulfilled/addressed. Course requisite requirements are not applicable to licensure/certification CPL approval.)

SECTION #3 IMPLEMENTATION	
Implementation term:	☐ Start of next academic year (summer term) ☐ Specify term (if BEFORE start of next academic year):
Curriculum Committee and VPIS approval is all that is required for the recognition of the submitted licensure/certifications as CPL. Therefore, once this has occurred, students may apply for CPL for the courses aligned with the approved licensure/certificate immediately.	

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Submitter	Email	Date
Department Chair (enter name of department chair):		
Department Dean/Director (enter name of department dean/director):		

NEXT STEPS:

1. Save this document as the course prefix and number (e.g. MTH 65 or HST 104). Send completed form electronically to curriculum@cgcc.edu or slewis@cgcc.edu.
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Stainless Steel GTAW/TIG Welding

Course Number: MFG 285

Transcript Title: Stainless Steel GTAW/TIG Welding

Created: Aug 15, 2022

Updated: Jul 12, 2023

Total Credits: 3

Lecture Hours: 0

Lecture / Lab Hours: 60

Lab Hours: 0

Satisfies Cultural Literacy requirement: No

Satisfies General Education requirement: No

Grading Options A-F, P/NP, Audit

Default Grading Options A-F

Repeats available for credit: 0

Prerequisites

MFG 150 (/courses/mfg-150)
MFG 195 (/courses/mfg-195)

Course Description

Introduces the use of GTAW/TIG equipment on stainless steel alloys, and the methods and techniques for welding on them. Explores different techniques and special shielding gas requirements for pipe, fillet and butt weldment as well as covering prep of materials, consumables and tungsten. Prerequisites: MFG 150, MFG 195. Audit available.

Course Outcomes

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

1. Demonstrate understanding of the unique shielding gas and back purging procedures necessary when welding and manufacturing products from stainless steel.
2. Identify stainless steel alloy properties and common use as they pertain to manufacturing.
3. Manufacture DC GTAW stainless steel pipe, fillet and groove weldments.

4. Correctly clean and prep weldments and tungsten for DC GTAW on stainless steel.
5. Demonstrate understanding of DC GTAW machine operation, setup and assembly of torch parts.
6. Manufacture a basic stainless steel pressure vessel.

Suggested Outcome Assessment Strategies

Outcomes are assessed through a mixture of hands on and written assessments. Priority is given to hands-on proficiency based assessment in an environment that rewards demonstration of skill needed for success in industry.

- Lecture and in booth coaching and direct instruction.
- Direct instruction in full class demonstration of skills.
- Written exams.
- Student proficiency through demonstration of learned strategies and skills in industry standard environment.
- Mock AWS Testing procedure (destructive testing) or mock local industry supported on-site testing procedures.
- Job readiness based on performance.

Course Activities and Design

The determination of teaching strategies used in the delivery of outcomes is generally left to the discretion of the instructor. Here are some strategies that you might consider when designing your course: lecture, small group/forum discussion, flipped classroom, dyads, oral presentation, role play, simulation scenarios, group projects, service learning projects, hands-on lab, peer review/workshops, cooperative learning (jigsaw, fishbowl), inquiry based instruction, differentiated instruction (learning centers), graphic organizers, etc.

Course Content

Outcome #1: Demonstrate understanding of the unique shielding gas and back purging procedures necessary when welding and manufacturing products from stainless steel.

- Identify different types of shielding gas and their application in welding processes and what gasses are used in GTAW welding of stainless steel alloys.
- Understand the use and necessity of back purging equipment in GTAW welding of stainless steel alloys.
- Demonstrate GTAW shielding gas techniques to minimize carbon contamination / corrosion / loss of austenitic properties in stainless steel.
- Demonstrate GTAW back purging to prevent “sugaring” oxidation on the back of stainless steel joints and pipe.

Outcome #2: Identify stainless steel alloy properties and common use as they pertain to manufacturing.

- Identify properties of 304 Stainless steel alloy, and it's uses in the manufacturing industry. Know the differences between 304SS from 308 and 316.
- Identify properties of 308 stainless steel alloy, and it's uses in the manufacturing industry. Know the differences between 308SS from 304 and 316.
- Identify properties of 316 stainless steel alloy and it's uses in the manufacturing industry. Know the difference between 316SS from 304 and 316.

Outcome #3: Manufacture DC GTAW stainless steel pipe, fillet and groove weldments.

- Perform pipe, butt, and fillet welds on aluminum of varying thicknesses using GTAW welder in lab.
- Perform 1G and 2G welds including correct prep of materials.
- Knowledge of necessary amperage adjustments to ensure full penetration of welds with a blind back side.

Outcome #4: Correctly clean and prep weldments and tungsten for DC GTAW on stainless steel.

- Clean and prepare materials for welding using chemical cleaning agents appropriate for stainless steel.
- Clean and prepare materials for welding using machine cleaning processes and procedures appropriate for stainless steel.

- Post clean materials using chemical agents or electrochemical process as done in industry applications.
- Know appropriate chemical MSDS and first aid.

Outcome #5: Demonstrate understanding of DC GTAW machine operation, setup and assembly of torch parts.

- Identify the correct tungsten types for use in DC GTAW and Stainless Steel welding.
- Identify the correct gas lens size and flow specific to DC GTAW welding on stainless steel.
- Prepare and assemble torch for DC GTAW welding.
- Identify parts used specifically for DC GTAW Welding.
- Identify correct amperage for different thicknesses and alloys of material.
- Setup DC GTAW equipment for welding stainless steel, including correct pulse settings.

Outcome #6: Manufacture a basic stainless steel pressure vessel.

- Manufacture a basic stainless steel pressure vessel from two different schedules of pipe and test to specification.
- Manufacture a basic stainless steel pressure vessel from plate and test to specification.

Suggested Texts and Materials

Resources are available openly on the web, but largely the curriculum adaptation needs to be done based on the instructors existing skill set. Since there are many ways to teach the content, the “teach what you know, and teach well what you do” is very appropriate for courses like this.

The following books are recommended:

- Welding Skills, 5th Edition, B.J. Moniz
- Welding Skills Workbook, 5th Edition, Jonathan F. Gosse

Some Suggested resources:

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- Thefabricator.com
- Aws.org
- Millerwelds.com
- Lincolnelectric.com

Department Notes

Safety glasses are required at all times in the welding lab and are provided for students. Students may also purchase their own safety glasses from a local supplier. Long pants and closed toed shoes are required in the welding lab at all times.

Appropriate clothing must be worn to work in the lab (no synthetic materials, ect.).

Safety requirements are covered prior to work in the lab.

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