I. INTRODUCTION

A. One critical area of aviation maintenance is the aircraft weigh and balance. This course is an introduction to Federal Aviation Administration (FAA) required subjects relating to weighing of aircraft, performance of weight and balance calculations and appropriate maintenance record entries.

B. This is an optional course of study for the Associate Degree of Applied Science in Aviation Maintenance Technology.

C. This course is occupationally related and serves as preparation for careers in the field of Aviation Maintenance.

D. Prerequisite: None

LEARNING OUTCOMES

Upon successful completion of this course, Weight and Balance, the student will:

A. Determine correct weighing procedures. (F1-F5,F10)

B. Ascertain the correct weighing conditions and obtain the correct aircraft weight. (C18,F1-F5,F10)

C. Calculate the most forward and rearward center of gravity. (F1-F5,F10)

D. Perform the correct documentation for aircraft weight and balance. (F1-F5,F10)

II. INSTRUCTIONAL MATERIALS

A. The instructional materials identified for this course are viewable through www.ctcd.edu/books
B. Supplemental Reading: None


III. COURSE REQUIREMENTS

The following will be required of each student for successful completion of this course:

A. Reading Assignment: Students are required to complete all reading assignments prior to the class in which the materials will be discussed. Students are subject to announced and unannounced written and oral examinations on assigned reading material.

B. Projects: The following five projects will be completed by students only after coverage of the subjects by course material. Students are required to demonstrate proficiency and knowledge in each area. (Projects are to be assigned based on instructor discretion and availability of resources).

1. Complete the weighing of an aircraft ensuring correct condition, aircraft in level attitude and correct measurements.

2. Perform weight and balance computations for correct empty weight.

3. Correctly compute the forward and rearward CG locations.

4. Correctly compute empty weight CG with all installed equipment.

5. Correctly compute loaded weight and determine safe CG limits.

C. Class performance: Students are required to attend all classes and to be in the classroom on time. The instructor can lower a student’s grade because of excessive tardiness. When absent from class for any reason, it is the student’s responsibility to arrange for and make up assignments missed during the absence.

D. Class Participation: Students will earn a satisfactory grade in the course by attending and regularly participating in class, giving complete attention to class activities, completion of all assigned work and successfully completing the examinations. Students are required to maintain a minimum GPA of 2.0 to receive a passing grade for the class and are encouraged to compute and monitor their GPA as the class progresses.

IV. EXAMINATIONS
A. There will be one written examination for this course covering all the lecture notes and reading material.

B. Practicum: Students will perform five projects based on the availability of resources.

V. SEMESTER GRADE COMPUTATION

<table>
<thead>
<tr>
<th>EXAMINATIONS</th>
<th>POINTS</th>
<th>POINT TO GRADE RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXAM 1</td>
<td>100</td>
<td>900-1000 = A</td>
</tr>
<tr>
<td>Practicum/Projects 1-5</td>
<td>100</td>
<td>800-899 = B</td>
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<tr>
<td>TOTAL</td>
<td>200</td>
<td>700-799 = C</td>
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<td></td>
<td></td>
<td>600-699 = D</td>
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<td>0-599 = F</td>
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VI. NOTES AND ADDITIONAL INSTRUCTIONS FROM COURSE INSTRUCTOR

A. **Course Withdrawal:** It is the student’s responsibility to officially drop a class if circumstances prevent attendance. In order to be officially withdrawn from the course, a student must obtain, complete and file an Application for Withdrawal form with the College. The student’s transcript will show “W” or “F”, depending on whether the student was passing or failing at the time of withdrawal.

B. **Administrative Withdrawal:** Students not meeting course objectives or not making satisfactory progress may be withdrawn from the course at the discretion of the instructor.

C. **Cellular Phones and Beepers:** Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

D. **American’s with Disabilities Act (ADA):** Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at [www.cted.edu/disability-support](http://www.cted.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.
E. **Instructor Discretion:** The instructor reserves the right of final decision in course requirements.

F. ** Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

VII. **COURSE OUTLINE**

A. **Lesson One:** Weight and Balance Theory

1. **Learning Outcomes:** upon successful completion of this module, the Student will:
   
   a. Understand the importance of weight and balance.
   
   b. Identify and define terms used in weight and balance.
   
   c. Identify Weight and Balance Documentation

2. **Learning Activities:**

   Successfully complete examination 1 covering material presented in Module 1. (F1,F5,F10)

3. **Equipment and Materials:** None

4. **Module Outline One:** Weight and Balance Theory
   
   a. Weight and balance theory
   
   b. Terms in Weight and Balance
   
   c. Locating the Center of Gravity (CG)
   
   d. Weight and Balance Documentation
      
      1. FAA-furnished information
      
      2. Manufacturer furnished documentation

B. **Module Two:** Aircraft Weighing

1. **Learning Outcomes:** upon successful completion of this module, the Student will:

   a. Describe the equipment required for weighing aircraft

   b. Describe preparations necessary for weighing aircraft
2. **Learning Activities:**

   Successfully complete examination 1 covering material presented in Module 1. (F1,F5,F10)

3. **Equipment and Materials:**

   An airplane, scales, plumb bob, manufacturer’s information and aircraft specifications

4. **Module Outline Two:** Weighing the aircraft

   a. Equipment for weighing
   b. Preparation for weighing

C. **Module Three:** Locating the Center of Gravity and Weight and Balance Computations

1. **Learning Outcomes:** upon successful completion of this module, the Student will:

   a. Locate the Center of Gravity with respect to the datum for tailwheel and nosewheel aircraft.
   b. Compute single engine aircraft weight and balance.
   c. Compute twin engine aircraft weight and balance.
   d. Identify and correct CG after alterations and repairs
   e. Compute large aircraft weight and balance.

2. **Learning Activities:**

   Successfully complete examination 2 covering material presented in Module 3.

3. **Equipment and Materials:**

   Airplane manufacturer’s specifications, weighting information and calculator.

4. **Module Outline Three:** Locating the Center of Gravity and Weight and Balance Computations
a. Locating the Center of Gravity (CG)
   1. Location with respect to the datum
      a. Tailwheel airplane with datum ahead of the main wheels
      b. Tailwheel airplane with the datum behind the main wheels
      c. Nosewheel airplane with the datum ahead of the main wheels
      d. Nosewheel with the datum behind the main wheels
   2. Location with respect to the Mean Aerodynamic Chord
b. Single engine aircraft weight and balance computations
   1. The loading graph
   2. CG moment index envelope
c. Twin engine aircraft weight and balance computations
   1. Finding the empty weight and empty weight CG
      a. The chart method
      b. The formula method
   2. Finding the operational center of gravity (CG)
      a. The chart method
      b. CG in percent of MAC
d. Adverse-Loaded CG Checks
   1. Forward CG check
   2. Aft CG check
e. Center of Gravity Change After Repair or Alteration
f. Determination of Needed Ballast
g. Large Aircraft Weight and Balance Computations