I. INTRODUCTION

A. The purpose of this course is to study Meteorology as it applies to Aviation Operations and Flight Safety. Subject areas to be covered include basic weather factors and theory, aviation weather hazards and the weather services that are available to the pilot.

B. This course is required to meet curriculum requirements for the Central Texas College program(s) Associate degree in Aviation Science.

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

II. OVERALL OR GENERAL OBJECTIVES OF THE COURSE

Upon successful completion of this course, Meteorology, the student will be able to:

A. Demonstrate through written tests and classroom discussion an understanding of basic meteorological phenomena and how the interaction of certain factors such as temperature, pressure, moisture and stability interact to produce various weather conditions. (C1, F1, F5, F7, F11)

B. Recognize weather conditions that are possibly hazardous to Flight Operations and understand how the pilot can best deal with these situations. (F1, F5, F11 F12)

C. Be familiar with the weather services that are available to the pilot for the flight planning process. (F1, F7)

D. Student will be able to read, decode and utilize the various weather reports, forecasts and charts available through The National Weather Service. (C5, C8, F1, F3, F5, F6, F7, F10, F11)

E. Student should be able to use their increased awareness of critical weather factors

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and information to make a competent go/no-go decision as an integral facet of the flight planning process. (C18, F1, F5, F7, F8, F9)

III. INSTRUCTIONAL MATERIALS

The instructional materials identified for this course are viewable through www.ctcd.edu/books

IV. COURSE REQUIREMENTS

A. Class attendance is vital to the successful completion of this class. Student must be committed to make every possible effort to attend all classroom sessions.

B. Students should complete all reading assignments prior to the material being covered in class. The preparation is necessary for the student to be able to participate in classroom discussions.

C. Students should be attentive in class and keep notes on all classroom presentations.

D. Students should be present for all scheduled examinations.

E. Student shall turn in all out of class assignments on or before the due date without exception.

V. EXAMINATIONS

A. There will be a minimum of four major examinations:

1. Exam 1
2. Mid-term exam
3. Exam 3
4. Final Exam

B. A review sheet will be provided by the instructor to assist the student in preparation for these exams. The Final Exam will NOT be comprehensive and will only cover the material covered since the third exam.

C. Attendance during scheduled exams is mandatory. Students who know in advance that they must miss a scheduled exam shall arrange with the instructor to take an early examination. Unexpected absences due to illness or other extenuating circumstances will require the student to see the instructor about individual make-up work in lieu of the missed examination. Documentation such as a doctor’s excuse may be required to validate the reason for the excused absence.
D. Students without excused absences will be given a zero for the missed examination.

VI. SEMESTER GRADE COMPUTATIONS

<table>
<thead>
<tr>
<th>Exams</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>100</td>
</tr>
<tr>
<td>Mid-Term exam</td>
<td>100</td>
</tr>
<tr>
<td>Exam 3</td>
<td>100</td>
</tr>
<tr>
<td>Final exam</td>
<td>100</td>
</tr>
<tr>
<td>Quizzes/Instructor Evaluation</td>
<td>50</td>
</tr>
</tbody>
</table>

TOTAL 450 points

POINTS TO GRADE RATIO

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>405 - 450</td>
<td>A</td>
</tr>
<tr>
<td>360 - 404</td>
<td>B</td>
</tr>
<tr>
<td>315 - 359</td>
<td>C</td>
</tr>
<tr>
<td>270 - 314</td>
<td>D</td>
</tr>
<tr>
<td>0 - 269</td>
<td>F</td>
</tr>
</tbody>
</table>

A student must take the final examination to receive a grade for the course.

NOTE: Instructor Evaluation will be based on classroom attendance and participation.

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM COURSE INSTRUCTOR

A. Withdrawal from course: It is the student’s responsibility to officially drop a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal or an Application for Refund. The withdrawal form must be signed by the student.

Application for Withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16 week fall and spring semesters. The deadline for sessions of other lengths is as follows.

- 11 week session: Friday of the 8th week
- 8 week session: Friday of the 6th week
- 5 ½ week session: Friday of the 4th week

The equivalent date (75% of the semester) will be used for session of other
lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

Students who officially withdraw will be awarded the grade of “W”, provided the student’s attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of “F” or “FN” for nonattendance.

B. **An administrative withdrawal**: An administrative withdrawal may be initiated when the student fails to meet College attendance requirements. The instructor will assign the appropriate grade on the Administrative Withdrawal Form for submission to the registrar.

C. **An Incomplete Grade**: The College catalog states, “An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course...” Prior approval from the instructor is required before the grade of “I” is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an “F” for the course.

D. **ADA Statement**: 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.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

(College policy-procedures statements)
BLOCK ONE

OBJECTIVES: To develop a basic understanding of meteorological theory and how elements present in the atmosphere interact to produce various weather conditions and flight environments.

CONTENTS: This block of instructions will be used to introduce the weather elements of the atmosphere such as pressure, temperature, moisture and stability.

COMPLETION STANDARDS: This block of instruction will be completed when the student can identify through classroom discussion and quizzing the weather elements that combine to determine conditions for flight operations.

LESSON ONE: The Atmosphere

OBJECTIVE: To develop an understanding of the earth’s atmosphere as it relates to weather.

CONTENT:

1. The composition of the atmosphere
2. Elements of a “Standard Atmosphere”
3. Air Density and Hypoxia

LESSON TWO: Temperature

OBJECTIVE: To develop an understanding of temperature as the key element in atmospheric conditions.

CONTENT:

1. Temperature measurements
2. Reasons for temperature variations

LESSON THREE: Atmospheric Pressure

OBJECTIVES: To develop an understanding of atmospheric pressure and altimetry as it relates to flight conditions and operations.

CONTENT:

1. Pressure measurements
2. Reasons for pressure variations
3. Pressure analysis
4. “Altitudes” used in flight operations
5. Importance of density altitude in determining aircraft performance

LESSON FOUR: The Creation of the Wind
OBJECTIVE: To be able to identify the key elements that create the wind and determine its velocity and direction.

CONTENT:

1. Convection versus advection
2. The importance of pressure difference and atmospheric equilibrium
4. Local & small scale winds

LESSON FIVE: Moisture, The “Fuel” of the Atmosphere

OBJECTIVE: To develop an understanding of the importance of moisture in the atmosphere in determining flight conditions and creating aviation weather hazards.

CONTENT:

1. Measurement of water vapor in the atmosphere
2. Terminology used in describing water vapor availability
3. Change of state of water vapor
4. Other factors effecting he existence of water vapor in the atmosphere

LESSON SIX: Atmospheric Stability

CONTENT:

1. How the stability of the atmosphere changes
2. Measurement of atmospheric stability
3. Effect of stability on cloud formation
4. Characteristics of stable and unstable air

LESSON SEVEN: Clouds

OBJECTIVE: To develop a basic understanding of the process of cloud formation and how cloud identification can give the pilot a visual cue as to flight conditions.

CONTENT:

1. Terms used in cloud identification
2. Types and families of clouds

LESSON EIGHT: Exam One
OBJECTIVES: To develop the students understanding of aviation weather hazards and how they relate to flight operations

COMPLETION STANDARDS: This block of instruction will be completed when the student can identify through classroom discussions and quizzing the weather factors that can develop into hazardous condition and how they can effect aircraft operations. The student should be able to identify the proper course(s) of action that are available to the pilot when encountering hazardous flight environments.

LESSON ONE: Air Masses and Fronts

CONTENT:

1. Air mass classification
2. Process of air mass modification
3. Characteristics of stable and unstable air
4. Definition and types of weather fronts
5. Common discontinuities across a frontal zone
6. Frontal weather conditions and characteristics

LESSON TWO: Turbulence

CONTENT:

1. Effects of turbulence on aircraft in flight
2. Cause of in-flight turbulence
3. Actions to take when encountering turbulence
4. How to avoid wake turbulence
5. Types of wind shear
6. Reporting turbulence Intensities

LESSON THREE: Aircraft Icing

CONTENT:

1. Conditions necessary for structural icing on aircraft
2. Types of structural icing
3. Actions to take when encountering structural icing
4. Induction and Instrument icing
5. Factors effecting icing conditions
6. Use of de-ice and anti-ice equipment

LESSON FOUR: Thunderstorms

CONTENT:
1. Conditions that are necessary for thunderstorm formation
2. Stages on the life cycle of a thunderstorm
3. How to identify a severe thunderstorm
4. Hazards associated with a thunderstorm
5. “Do’s & Don’ts” of thunderstorm flying.

LESSON FOUR: Factors Effecting Flight Visibility (IFR conditions)

CONTENT:

1. Conditions necessary for formation of fog
2. Types of fog
3. Other factors that can create instrument meteorological conditions (IMC)
4. Visibility and ceiling determination

LESSON FIVE: Mid-Term Examination

BLOCK THREE

OBJECTIVES: To familiarize the student with the weather services available to the pilot and
develop the student’s ability to read and interpret the various weather reports and forecasts.

COMPLETION STANDARDS: This block of instruction will be completed when the student
can demonstrate through quizzing and home-work assignments the ability to decode, read and
interpret weather reports and forecasts and use that information to make a competent “go/no go”
decision for flight operations.

LESSON ONE: Weather Services

CONTENT:

1. National Oceanic and Atmospheric Administration (NCAA)
2. National Weather Service (NWS)
3. Federal Aviation Administration (FAA)
4. Other weather agencies and services
5. Information about a planned flight given to a weather briefer
6. Types of weather briefings
7. Format of a standard weather briefing

LESSON TWO: Aviation Routine Weather Report (METAR)

CONTENT:

1. Format and organization of METARs
LESSON THREE: Pilot Reports (PIREPS)

CONTENT:

1. Importance of pilot reports to flight planning
2. Format of PIREPS
3. Icing and turbulence intensities used for PIREPS

LESSON FOUR: Radar Reports (RAREPS)

CONTENT:

1. Format and organization of RAREPS
2. Symbols and abbreviations used for RAREPS
3. Intensities and trends as reported in RAREPS
4. Interpreting RAREPS information

LESSON FIVE: Terminal Aerodrome Forecast (TAF)

CONTENT:

1. Format and organization of TAFs
2. Symbols and abbreviations used for TAFs
3. Interpreting TAF information
4. Use of TAFs in flight planning process
5. Types of TAFs
6. Times of issuance for TAFs

LESSON SIX: Aviation Area Forecast (FA)

CONTENT:

1. Format and organization of FAs
2. Symbols and abbreviations used for FAs
3. Use of FAs in flight planning process
4. Types of FAs
5. Times of issuance for FAs

LESSON SEVEN: Winds and Temperatures Aloft Forecast (FD)
CONTENT:

1. How FD information is presented
2. How to interpolate between reported flight levels
3. Omission of information on FDs

LESSON EIGHT: Other Sources of Aviation Weather Information

CONTENT:

1. Convective Sigmets
2. Sigmets
3. Airmets
4. TWEB Route Forecasts
5. HIWAS
6. EFAS (Flight watch)

LESSON NINE: Exam Three

BLOCK FOUR

OBJECTIVES: To familiarize the student with the available weather charts that are used to supplement the information received from weather reports and forecasts.

COMPLETION STANDARDS: This lesson will be complete when the student demonstrates through written exam the ability to read weather charts and apply the information received to the flight planning process:

LESSON ONE: Weather Observation Charts

CONTENT:

1. Surface Analysis chart
2. Weather Depiction Chart
3. Radar Summary Chart
4. Observed Winds Aloft Chart

LESSON TWO: Weather Prognostic Charts

CONTENT:

1. U.S. Low Significant Weather Prog.
2. U.S. High Level Significant Weather Prog.
4. Severe Weather Outlook Chart
5. Constant Pressure Analysis Chart
6. Tropopause Data Chart

LESSON THREE: Composite Moisture Stability Chart

CONTENT:

1. Stability panel
2. Freezing level panel
3. Precipitable water panel
4. Average relative humidity panel

LESSON FOUR: Final Exam