

San Bernardino Valley College
Board of Trustees: 12/12/2019
Curriculum Approval: 11/04/2019
TOP Code: 3020.20 - Piloting*
Chancellors Office Approval: 01/21/2020
C-ID: N/A
Effective Date: Fall 2020
Course Identification Number: CCC000611250



I. CATALOG DESCRIPTION:

A. Department Information:

Division: Applied Technology, Transportation & Culinary Arts
Department: Aeronautics
Course ID: AERO 646
Course Title: Aviation Weather
Hours: 48 - 54
Lecture: 48 - 54 contact hour(s) per semester

Prerequisite: None

B. Catalog Description:

This noncredit course covers the aspects of weather as they relate to aircraft operation and safety. It includes basic and hazardous weather, atmospheric winds, pressure systems as associated with weather, cloud formation, air masses and fronts, thunder storms, turbulence and icing, fog, haze and smoke, high altitude, arctic and tropical weather, interpretation of weather reports, forecast, charts and maps.

C. Schedule Description:

This noncredit course covers the aspects of weather as they relate to aircraft operation and flight safety. It includes basic and hazardous weather and interpretation of weather reports, forecast, charts, and maps.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT:

III. STUDENT LEARNING OUTCOMES:

- A. List the services provided by the aviation weather service program
- B. Decipher codes and abbreviations in aviation weather reports to determine if flight is safe
- C. Distinguish between the different types of cloud formations and how they affect aircraft flight

IV. NONCREDIT: NUMBER OF TIMES TAKEN: 99

V. COURSE OBJECTIVES FOR STUDENTS:

Upon successful completion of the course the student should be able to:

- A. Read and critically evaluate weather charts and forecast
- B. Identify and respond to marginal or hazardous weather

- C. Recognize weather related problems for pilots
- D. Analyze and explain weather that would affect aircraft operation and/or flight safety
- E. List the precautions to observe in thunderstorm flying
- F. Compare the types of turbulence and how they affect aircraft flight
- G. Differentiate between the different types of weather reports and forecast

VI. COURSE CONTENT:

- A. Atmospheric composition and temperature
 - 1. Composition
 - 2. Vertical structure
 - 3. Density
 - 4. Heating
 - 5. Temperature variations
- B. Atmospheric winds, pressure, and altimetry
 - 1. Atmospheric pressure
 - 2. Altimetry
 - 3. Convection
 - 4. Pressure gradient force
 - 5. Coriolis force
 - 6. General circulation
 - 7. Friction
 - 8. Jet stream
 - 9. Local winds
 - 10. Pressure systems and associated weather
- C. Moisture, cloud formation, and precipitation
 - 1. Water vapor
 - 2. Change of state
 - 3. Cloud formation
 - 4. Precipitation
 - 5. Land and water effects
- D. Stability
 - 1. Temperature lapse rate
 - 2. Dry and saturated adiabatic lapse rates
 - 3. Vertical air movement
 - 4. The effect of stability on weather
 - 5. Temperature inversions
- E. Air masses and fronts
 - 1. Types of air masses
 - 2. Types of fronts
 - 3. Weather associated with fronts
 - 4. Flight planning
- F. Thunderstorms
 - 1. Where and when to expect thunderstorms
 - 2. Stages of development
 - 3. Types of thunderstorms
 - 4. Hazards
 - 5. Thunderstorms and radar
 - 6. Do's and don'ts of thunderstorm flying
- G. Turbulence and icing
 - 1. Convective currents
 - 2. Obstructions to wind flow
 - 3. Wind shear
 - 4. Wake turbulence

5. Structural icing
 6. Induction icing
 7. Icing and cloud types
 8. Frost
- H. Fog, haze and smoke
1. Formation of fog
 2. Types of fog
 3. Low status clouds
 4. Temperature, inversions- haze and smoke
 5. Obscured or partially obscured sky
- I. High altitude, arctic and tropical weather
1. The jet stream
 2. Clear air turbulence
 3. Condensation trails
 4. Cirrus clouds
 5. Arctic peculiarities
 6. Arctic weather hazards
 7. Tropical circulation
 8. Tropical thunderstorms
 9. Transitory systems
- J. Aviation weather service program
1. Data flow
 2. Types of observations
 3. Weather service outlets
 4. Service users
- K. Surface, pilot, and radar weather reports
1. Type and time of report
 2. Sky condition and ceiling
 3. Visibility
 4. Weather and obstructions to visibility
 5. Sea level pressure
 6. Temperature
 7. Winds
 8. Altimeter setting
 9. Remarks to weather
 10. Pilot weather reports (PIREPS)
 11. Radar weather reports (RAREPS)
- L. Aviation weather forecast
1. Terminal forecast
 2. Area forecast
 3. Transcribed Weather Broadcasts (TWEB) - route forecast and synopsis
 4. In-flight advisories
 5. Winds and temperatures aloft forecast
 6. Hurricane advisory
 7. Convective outlook
 8. Severe weather watch bulletin
- M. Surface, direction and radar charts
1. Surface analysis
 - a. Plotted data
 - b. Pressure systems
 - c. Fronts
 - d. Weather
 - e. Using the chart
 2. Depiction analysis

- a. Plotted data
 - b. Using the chart
- 3. Radar summary
 - a. Plotted data
 - b. Using the chart
- N. Constant pressure, winds aloft, and prognostic charts
 - 1. Constant pressure analysis
 - a. Plotted data
 - b. Using the chart
 - 2. Winds and temperature aloft
 - a. Plotted data
 - b. Using the chart
 - 3. Significant weather prognostic
 - a. Plotted data
 - b. Using the chart
 - 4. Constant pressure prognostic
 - a. Formats
 - b. Using the chart
 - 5. Severe weather outlook
 - a. Thunderstorms
 - b. Tornadoes
 - c. Using the chart

VII. METHODS OF INSTRUCTION (May include any, but do not require all, of the following):

- A. Lecture
- B. Guest speakers
- C. Class and/or small group discussion
- D. Use of films, videotapes, or other media
- E. Use of written materials: texts, journals, etc.
- F. Instructor generated handouts

VIII. TYPICAL OUT-OF-CLASS ASSIGNMENTS:

- A. Reading assignments are required and may include (but are not limited to) the following:

Read the chapter on cumulus clouds and be prepared to discuss them in class.

- B. Writing assignments are required and may include (but are not limited to) the following:

Write a two page paper comparing and contrasting the difference between cumulus, stratus, and cirrus clouds including shape, altitude, and characteristics with regard to flight safety.

- C. Critical thinking assignments are required and may include (but are not limited to) the following:

Read the assigned weather briefing. Decipher the codes and determine if flight is safe under visual flight rules.

IX. METHODS OF EVALUATION

- A. Class participation
- B. Examinations
- C. Homework
- D. Presentations (oral or visual)
- E. Written papers or reports
- F. Quizzes
- G. Cumulative finals or certifications

X. TYPICAL TEXT(S):

- A. Federal Aviation Administration (FAA) Staff Aviation Weather. Aviation Supplies and Academics Inc., 2016.
- B. Federal Aviation Administration (FAA)/Aviation Supplies and Academics Inc. Aviation Weather Services. Aviation Supplies and Academics Inc., 2018.
- C. Federal Aviation Administration (FAA)/Aviation Supplies and Academics Inc. (ASA) Federal Aviation Regulations/Aeronautical Information Manual (FAR/AIM). 2017 ed. Aviation Supplies and Academics Inc., 2017.

XI. OTHER SUPPLIES REQUIRED OF STUDENTS:

- A. None