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Spring 1998

SAN BERNARDINO VALLEY COLLEGE
COURSE OUTLINE

I. CATALOG DESCRIPTION:

AERO 144: AVIATION WEATHER
3 hours lecture = 3 units

The aspects of weather as related to aircraft operation and flight safety. Includes basic and hazardous weather and interpretation of weather reports, forecasts, charts and maps.

Prerequisite(s): None

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

III. EXPECTED OUTCOMES FOR STUDENTS:

After completing the course, the student will be able to:

A. Read and critically evaluate weather charts and forecasts;

B. Identify and respond to marginal or hazardous weather;

C. Recognize and identify weather related problems for pilots; and

D. Explain and analyze weather that would affect aircraft operation and/or flight safety.

IV. CONTENT:

A. Atmospheric Compition 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. Wind shear
11. 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 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. Type 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 Forecasts
1. Terminal forecast
2. Area forecast
3. TWEB - route forecast and synopsis
4. Inflight 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

O. Field Trip to FAA Flight Service Station Aviation Weather Briefing Facility to obtain weather for a theoretical cross-country flight using current weather reports, charts, and forecasts.

V. METHODS OF INSTRUCTION:

A. Lecture;
B. Discussion between teacher and students or from students working in a group;
C. Audio visual aids and demonstrations; and
D. Written homework assigned at each class meeting will be a minimum of 6 hours per week.

VI. TYPICAL ASSIGNMENTS:

A. Read assigned chapter in text book and answer assigned questions.
    1. Typical question: Compare and contrast the difference between cumulus, stratus and cirrus clouds including shape, characteristics with respect to flight safety and altitudes of each.

B. Read assigned weather briefing and decipher codes and determine if flight is safe under visual flight rules.

VII. EVALUATION(S):

A. Methods of evaluation:
    1. Oral questioning;
    2. Timely quizzes;

3. Section exams; and
4. Final exams
   Typical questions:
   a. Describe the characteristics of towering cumulus clouds and their hazards to aircraft flight.
   b. Read assigned weather briefing and decipher codes and determine if flight is safe under visual flight rules.

B. Frequency of evaluation:
1. Weekly assignments and quizzes
2. One mid-term examination
3. One final examination.

VIII. TYPICAL TEXT:

Title: Aviation Weather AC00-6A (Three books in all)
Author: Super. of Docs Publisher: US Government
Date of Publication: 1975

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: None