Course Objectives/Course Outline
Spokane Community College

Course Title: **Weather and Climate**
Prefix and Course Number: **ENVS 211**

Course Learning Outcomes:
By the end of this course, a student should be able to:

- identify and define meteorological and climatological phenomena including winds, weather fronts, air mass, clouds, temperature and precipitation
- compute and equate weather and climate
- develop and analyze weather maps
- identify and describe forecasting and instrumentation techniques

Course Outline:

I. Structure and Atmosphere
   A. Vertical Arrangement of the Atmosphere
   B. The Cycles of O, N. H_2O, CO_2 and O_3
II. Energy of the Atmosphere
   A. Two Laws of Thermodynamics
   B. Heat Transfer
   C. Solar Energy
   D. Phase Changes in Water
   E. Solar Radiation and Temperature
   F. Angle and Solar Energy
III. Vertical Motion in the Atmosphere
   A. Newton's Laws of Motion
   B. Thermal Circulation
   C. Adiabatic Processes
   D. Vertical Stability
   E. Causes of Changes in Vertical Stability
IV. Clouds, Precipitation and the Hydrologic Cycle
   A. Cloud formation
   B. Clouds and Fronts
   C. Formation of Precipitation Types
V. Horizontal Motion in the Atmosphere
   A. Jet Streams
   B. Monsoons
   C. Land-Sea Breezes
   D. Mountain-Valley Winds and their Common Names
   E. Foehn Winds
   F. Katabatic Winds
VI. Atmospheric Measurements

VII. Weather Systems
- A. Classes of Air Masses
- B. Fronts
- C. Formation of Wave Cyclone
- D. Formation of Hurricanes
- E. Sectors of a Hurricane
- F. Formation of Tornadoes
- G. Formation of Hail
- H. Major Air Masses Affecting North America
- I. Thunderstorms
- J. Lightning and Thunder

VIII Climate
- A. 4 Major Factors that Control Climate
- B. 2 Factors Most Indicative of Climate
- C. Types of Temperature Indices
- D. Precipitation Regions and their Relationship to global General Circulation
- E. Cycles in Weather—Droughts or Rainy Years
- F. Lakes and Microclimates
- G. Koppen System of Climate Classification
- H. Effects of Man on Microclimate
- I. Effects of Man on General climate
- J. 3 Categories of Causes of Climate Change

IX. Applications of Meteorology: Forecasting and Its Consequences
- A. Importance of Temperature and Precipitation
- B. Ranges on Crops
- C. Use of Fuel Moisture Stick
- D. Effect of Turbulence on Flying
- E. Aviation Weather Services
- F. Effects of Weather
- G. Typical Weather Patterns