

MEA 213: Introduction to Meteorology – Fall Semester

Required Text: C. Donald Ahrens, Meteorology Today. Additional reading materials will be handed out in class.

Course prerequisites: This course is designed for beginning meteorology students. Knowledge of high school-level algebra, geometry, trigonometry, chemistry and physics is required. Students should have basic computer usage skills including web browsers and email.

Course purpose: The sequence MEA 213 (Fall semester) and MEA 214 (Spring semester) introduces students to the major concepts in meteorology and lays the foundation for more advanced courses in meteorology.

Student learning outcomes: By the end of the course you should be able to do the following things:

Specialist Vocabulary: Recognize and define the major terms that apply to meteorology.

Structure of the atmosphere: Explain the chemical composition and vertical structure of the atmosphere.

Weather maps: Read, interpret and plot station information from weather maps. Read, interpret and plot isotherms and isobars. Determine wind direction and relative magnitude from maps of atmospheric pressure. Determine the location of ridges, troughs, and likely locations of storms.

Stability: Explain the characteristics of atmospheric profiles in stable, unstable and conditionally unstable conditions and the associated motion of air parcels within each type of profile. Identify the lifting condensation level and temperature inversions from atmospheric sounding data.

Cloud identification: Explain and make WMO okta measurements of cloud coverage. Identify basic cloud types with low, middle and high cloud bases.

Moisture: Define and calculate derived moisture parameters such as dew point, specific humidity, and mixing ratio from measured atmospheric variables.

Precipitation: Explain the physical processes that form rain, snow, hail, and freezing rain. Identify precipitation types in weather radar data.

Weather variability: Identify and explain how the diurnal cycle influences local weather variability. Identify and explain the difference between warm and cool ENSO cycles and how these influence regional weather.

Climate Change: Explain the physical process whereby greenhouse gases warm the atmosphere. Identify and explain likely climate change impacts and potential sources of abrupt climate change.

Computation: Use a spread sheet program to read in observed data sets and calculate and plot atmospheric variables versus time and versus other atmospheric variables.

Teamwork: Work effectively in problem-solving teams.