Eastern Illinois University
Revised Course Proposal
GEO 1400G, Weather and Climate

1. Catalog description

GEO1400-G. Weather and Climate. (3-2-4) F, S. Weather/Climate. The course provides a basic understanding of global weather and climate processes. It emphasizes prominent theoretical and applied aspects of the atmosphere that affect our everyday life. Topics covered also include contemporary issues such as weather analysis, severe weather, weather forecasting, and climate change. Writing active.

2. Student learning objectives

a. Students will:
- learn how the atmospheric processes operate to produce the weather of a location (critical thinking)
- analyze regional weather maps to describe and report on various components of the atmosphere (writing, critical thinking)
- conduct laboratory exercises using meteorological data (writing, critical thinking)
- research a weather topic and present an oral presentation on the outcome of the research (speaking, critical thinking)
- write essays 2-3 pages long in class on daily weather variability (writing, critical thinking)
- learn how human activities affect local and regional weather (critical thinking)

b. Students will:
- Learn how geographic distribution of weather and climate impacts their everyday lives

3. Course outline

(X) 50 minute lecture period
(X) 50 minute of laboratory period

1. Introduction to Weather and Climate **(4) [4]**
   A. Interrelationships among the sciences
   B. Hydrosphere, lithosphere, atmosphere, and biosphere
   C. Developments of the science of the atmosphere
   D. Origin, composition, and structure of the atmosphere
   E. Ozone depletion
   F. Exploring the atmosphere

2. Solar and Terrestrial Radiation **(4) [2]**
   A. Earth - sun relationships
   B. Global energy balance
   C. Insolation and seasons
   D. Latitude and energy balance
   E. Human impact on the earth's radiation
   Test I

3. Heat and Temperature **(4) [4]**
   A. Temperature and energy distribution
   B. Temperature measurements
   C. Vertical and horizontal variation of temperature
   D. Diurnal and annual cycle of temperature
   E. Temperature regimes
   F. Controls of temperature
   G. Heating, cooling, and growing degree-days

4. Atmospheric Moisture and Precipitation **(4) [4]**
   A. Hydrologic cycle
   B. Evaporation, condensation, precipitation, and runoff
   C. Nature of Precipitation
   D. Precipitation form, processes, and distribution
   E. Precipitation and its' measurement
   F. Acid precipitation
   G. Clouds and fogs
   H. Dew and frost formations
   I. Atmospheric stability and instability
   Test II

5. Air Pressure and Winds **(4) [2]**
   A. Atmospheric pressure system
   B. Air in motion
   C. Controls of winds
   D. Idealized global wind circulation system
   E. Air pressure and our environment
   F. Air pollution
   G. Meteorological factors affecting pollution levels

6. Air Masses and Fronts **(4) [4]**
   A. Air masses and source regions
   B. Classification of air masses
   C. Properties of North American air masses
   D. Fronts and their types
   E. Weather of the Midwestern United States
   F. Cyclogenesis
   G. Wave cyclones
   Test III

7. Severe Weather and the Environment **(4) [2]**
   A. Thunderstorms and lightning
   B. Hailstorms and their formation
   C. Microbursts and macroburst as hazards
   D. Tornadoes, their occurrences and destruction, tornado scale
   E. Weather disturbances and global environment

8. Cyclonic Storms and Hurricanes **(3) [2]**
   A. Hurricane formation and decay
   B. Profile of a hurricane
   C. Recent hurricanes in the United States

D. Hurricane tracking
E. Anticyclone

9. Weather Analysis and Forecasting **(3) [2]**
   A. Weather maps and charts
   B. Weather forecasting
   C. Remote sensing in meteorology
   Test IV

10. Global Scope of Climate **(4) [2]**
    A. Climatic classification and world climates
    B. Koppen's classification scheme
    C. Other classifications of climate

11. Climate Change **(4) [2]**
    A. Theories of climate change
    B. Urban or city climate
    C. Climate reconstruction
    D. Climate prediction
    E. Humans' impact on climate
    F. Research in climatology

12. Reviews and Conclusion **(3)**

Final Examination

4. Evaluation of student learning

a. Performance on examinations, laboratory exercises, written and oral reports, and class interactions will be evaluated in order to determine students' ability to synthesize and draw conclusion on weather and climate related data. The final course grade will be determined by the following:

Hourly essay and objective tests	60%
Writing assignments, exercises, and presentations	20%
Final test	20%

b. This course will meet the requirements for the ing active component of the course description. Students will work on a different laboratory exercise each week requiring writing and analyzing weather data. They will also be expected to submit 2-3 page written reports frequently on related topics taught in class. In addition, some examinations will be completely in essay format requiring considerable writing.

5. Rationale

a. The course will be placed in the Scientific Awareness segment of General Education under physical science. It will provide students with the opportunity to survey how generations of scientists advanced the study of the atmosphere that has a significant impact on almost every sphere of our lives. Scientific methodology will be illustrated by readings and laboratory exercises. Laboratory exercises will require students to analyze data (provided by instructors or gathered by students) and generate plausible conclusions. Successful completion of the course will enhance students' ability to think critically toward becoming a responsible global citizen. The course will

further meet the specific mission of the General Education program at Eastern Illinois University in the following manner:

1. Enhancing Literacy and Oral communication:
   Literacy and oral communication skills will be enhanced, as students will be required to fulfill reading assignments, take written examinations, complete laboratory exercises, and have oral presentations. Participation in class discussions will further enhance students' oral communication skills.

2. Critical and Reflecting Thinking:
   Critical, logical, independent thinking and inquiry will be pursued by each student in order to successfully complete the written and oral reports. Class discussions in the format of question and answer sessions will encourage critical thinking. Written reports will contain feedback from the instructor as well. Laboratory exercises will be specifically designed to improve students' critical and reflective abilities in drawing scientific conclusions through analysis of weather and climatic data. Course contents dealing with the methods, techniques, and current research of atmospheric science will illustrate how research is applied to solve problems through critical thinking.

3. Responsible Global Citizenship
   Every human being has some global responsibility. Comprehension of materials presented in the classroom and laboratory will allow students to improve their awareness of global weather and climate as they have influenced human history. Collectively, as a global society, each citizen must be made aware of the degradation of our atmosphere. This course will detail the problems and present actions individual citizens and societies should take to prevent further damage to the atmospheric commons. It will also present potential solutions to ensure air quality for future generations. Upon completion of this course, students should have a deeper appreciation of the manner in which weather and climate affects humanity and the environment. One hopes that this will lead to a lifelong awareness and interest in the condition of the earth's atmosphere.

b. The course will be taught at introductory level and therefore will be numbered as GEO 1400G. It will require no prerequisites.

c. This course is a revision of ESC1400C and should maintain the same curriculum as ESC 1400C. Adoption of the course will not have effects on any existing programs.

   1. The proposed course (GEO 1400G) is a revision of our existing Weather and Climate (GEO 1400C) course. The existing course has served as a very successful general education core course fulfilling the scientific awareness segment for past several years. The present proposed course would replace the existing course meeting the general education guidelines.
   2. The proposed course will meet the requirements for the new general education criteria, mission, objectives, and guidelines.
   3. Approval of the course will not involve any program modification since at the present time it is one of the general education core courses.

d. In addition to fulfilling the physical science requirement for the general education core under the Scientific Awareness segment, GEO 1400G is a required course for majors in Geography. It is also be required for minors in Earth Science and Earth Science for Teacher Certification. It may also count in the geography minor. It will not cause any changes in any major or minor.

6. Implementation

a. List faculty member(s) to whom the course will be assigned initially: geography staff.
b. Identify the textbook(s) and supplementary materials to be used, including publication dates:
Text: Lutgens, F. K. and Tarbuck, E. J., 1998, The Atmosphere, 7th ed., Prentice-Hall Inc.
c. Specify any additional costs to students: $ 4.00 approved course charge
d. List the term in which the course will be first offered: Spring Semester 2001.

7. Community College Transfer

A community college course may be judged equivalent to this course.

8. Date approved by the department: 2/18/2000

9. Date approved by the College of Sciences Curriculum Committee: 3/24/2000

10. Date approved by CAA: 10/19/2000

Department contact person: Dr. Alan Baharlou**,** Chairperson

Campus Phone: 217-581-2626