

General Education Course Proposal

Proposed Course: GEOG 115 Violent Weather/Climatic Hazards Units 3
Prefix No. Title

Department: Geography School: College of Social Sciences

GE Category (Indicate one category only):

Foundation: A1___; A2___; A3___; B4___
Breadth: B1___; B2___; C1___; C2___; D___; E___
Integration: B_x; C___; D___; International/Multicultural___

Existing Course ___; Revised Course ___; New Course X

Course Included in Current GE Program ___

New courses require the Undergraduate Course Proposal form in addition to this form.

Revised courses require the Undergraduate Course Change Request in addition to this form.

Proposed catalog description: Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

Prerequisite: Completion of General Education Foundation and Area B Breadth Requirements. Hurricanes, tornadoes, thunderstorms, lightning, destructive winds, heat waves, drought, severe winter storms, floods and physical laws and processes that account for their formation and behavior; human impacts. General Education Integration, Area B. (3 lecture hours)

Enrollment limit per section: 50

Expected number of sections per semester – Year 1 2; Year 3 6

Attachments:

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

Approval for Inclusion in General Education

<u>Shirley W. Pennington</u> Department Chair	<u>2-9-00</u> Date	<u>John Puzo</u> School Curriculum Committee	<u>2/17/00</u> Date
<u>Ellen Guenther</u> School Dean	<u>2/23/2000</u> Date	<u>Redmond</u> General Education Subcommittee	<u>3/10/00</u> Date
<u>Priscilla Kehoe</u> Associate Provost	<u>3/10/00</u> Date		

In order to encourage the application of comparatively common standards, all faculty members teaching sections of Violent Weather/Climatic Hazards will meet at the beginning of each semester to discuss grading practices, student assignments and workload, and the content of examinations. In keeping with University policy, furthermore, grading practices will be reviewed by the Department Chair on a regular basis.

Common Syllabus

Geography 115 Violent Weather/Climatic Hazards (3 units) Semester/Year

This course is concerned with violent weather events and climatic hazards. Its purposes are to provide a description of these phenomena and an explanation of their formation, behavior, and occurrence in time and space. Students are introduced to the basic principles of meteorology and climatology necessary to their understanding. These principles, in turn, are applied in an integrative way to explain their occurrence and formation—they are treated as systems. Also addressed are the methodologies, including the application of mathematics, employed in their analyses. Impacts on human societies are considered.

Prerequisites: Completion of all of the General Education Area B Breadth requirements as well as all of the General Education Foundation requirements.

Instructor:

Office: Hours/Location

Telephone/Email:

Required Text/Readings: Appropriate examples are

Ahrens, Donald. *Meteorology Today*. 6th edition. West Publishing Co.
Underwood, Jeffery. *Severe Weather*. Reading Packet, CSU Fresno
Bookstore.

Course Structure

Following an introduction to the course, the basic elements of physical climatology, synoptic meteorology, hydroclimatology, and the climatology of atmospheric hazards are treated. The remainder of the course is devoted to a consideration of a number of types of violent weather and climatic hazards. Each type will be examined employing the following framework.

- introduction to the event/hazard
- analysis of the geography and spatial patterns of the event/hazard
- investigation of the physical processes involved in the creation of the event/hazard
- explanation of the conditions (surface and upper air) that contribute to the formation of the event/hazard
- examination of current analytical and forecast technology
- assessment of human impacts of the event/hazard
- consideration of case studies of the event/ hazard

Writing Requirement: All students will be required to satisfy the 4000 word writing requirement. This will include, furthermore, a significant sustained writing component totaling at least 2000 words. This section of the syllabus will describe the ways this requirement is to be satisfied.

Course Grading: This part of the syllabus details the way in which grades are assigned. All grades in all sections of the course are to be based primarily on performance on examinations and/or quizzes although written work will have a significant impact. In addition to the use of examinations, quizzes and written assignments, grades may be based in part on class participation, out of class assignments (e.g., problem sets requiring mathematical solutions), or other work. Credit will not be awarded for attendance although instructors may penalize students for poor attendance. All students will be required to take the final examination.

Cheating and Plagiarism: “Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving a grade or obtaining course credit.” “Plagiarism is a specific form of cheating that consists of the misuse of the published and/or unpublished works of others by misrepresenting the material so used as one’s own work.” Students are expected to do their own work and instances of alleged or suspected cheating or plagiarism will be dealt with according to University policy.

Students with Disabilities: Students with disabilities should identify themselves to the instructor so that reasonable accommodations for learning and evaluation can be made. It is also recommended that students with disabilities contact the office of Services for Students with Disabilities in the Madden Library.

Course Outline

- A. Topic: Introduction to Violent and Dangerous Weather and Climatic Hazards
Approximately one week (Area B Specifications I, II, III, IV, V a, b, and f)

Assignment

B. Topic: Physical Climatology Approximately two weeks (Area B Specifications I, II, III, IV, V a, and f)

- Radiation
- Temperature
- Atmospheric Moisture
- Atmospheric Stability
- Precipitation
- Atmospheric Pressure/Density
- Motion in the Atmosphere/Wind

Assignment

C. Topic: Synoptic Meteorology Approximately two weeks (Area B Specifications I, II, III, IV, V a, and f)

- Scale of Atmospheric Phenomena
- Patterns of Atmospheric Circulation
- Air Masses and Weather
- Cyclones and Anticyclones

Assignment

C. Topic: Hydroclimatology Approximately one week (Area B Specifications I, II, III, IV, V a, and f)

- Precipitation Patterns
- Precipitation
- Precipitation Types
- Climatological Context for Flooding

Assignment

D. Topic: Thunderstorms Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)

- Definition/Description
- Geography and Spatial Patterns
- Physical Processes
- Anomalous Conditions Leading to Violent/Dangerous Thunderstorms
- Technology/Data/Methods Employed in the Analysis of Thunderstorms
- Case Studies/Human Impacts/Ethical Issues

Assignment

E. Topic: Straight-Line Winds Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)

- Definition/Description
- Geography and Spatial Patterns
- Physical Processes

Anomalous Conditions Leading to Destructive Straight-Line Winds
Technology/Data/Methods Employed in the Analysis of Straight-Line Winds
Case Studies/Human Impacts/ Ethical Issues

Assignment

F. Topic: Lightning Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)

Definition/Description
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Dangerous Lightning Storms
Technology/Data/Methods Employed in the Analysis of Lightning
Case Studies/Human Impacts/Ethical Issues

Assignment

G. Topic: Tornadoes Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)

Definition/Description
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Tornadoes
Technology/Data/Methods Employed in the Analysis of Tornadoes
Case Studies/Human Impacts/Ethical Issues

Assignment

H. Topic: Tropical Cyclones/Hurricanes Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)

Definition/Description
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Tropical Cyclogenesis
Technology/Data/Methods Employed in the Analysis of Tropical Cyclones
Case Studies/Human Impacts/Ethical Issues

Assignment

I. Topic: Flooding Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)

Definition/Description
Geography and Spatial Patterns
Physical Processes

Anomalous Conditions Leading to Flooding
Technology/Data/Methods Employed in the Analysis of Flooding
Case Studies/Human Impacts/Ethical Issues

Assignment

J. Topic: Heat Waves and Drought Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)
Definitions/Descriptions/Relationships
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Heat Waves and Drought
Technology/Data/Methods Employed in the Analysis of Heat Waves and Drought
Case Studies/Human Impacts/Ethical Issues

Assignment

K. Topic: Frozen Precipitation Approximately one week (Area B Specifications I, II, III, IV, V a, b, c, d, e, and f)
Definitions/Description of Types
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Hazardous Frozen Precipitation
Technology/Data/Methods Employed in the Analysis of Dangerous Frozen Precipitation
Case Studies/Human Impacts/ Ethical Issues

Assignment

L. Course Summary and Final Discussion Topics (Area B Specifications I, II, III, V b, c, d, e, and f)
Elements Common to Hazardous Climatologies
Changing Patterns of Climatic Hazards
Human Induced Climatic Hazards
Future Technologies and the Study of Violent Weather and Climatic Hazards

Assignment

General Education Proposal
Attachment III

Typical Syllabus

Geography 115. Violent Weather/Climatic Hazards
(3 units)

Fall, 2000

This course is concerned with violent weather events and climatic hazards. Its purposes are to provide a description of these phenomena and an explanation of their formation, behavior, and occurrence in time and space. Students are introduced to the basic principles of meteorology and climatology necessary to their understanding. These principles, in turn, are applied in an integrative way to explain their occurrence and formation—they are treated as systems. Also addressed are the methodologies, including the application of mathematics, employed in their analyses. Impacts on human societies are considered.

Prerequisites: Completion of all of the General Education Area B Breadth requirements as well as all of the General Education Foundation requirements.

Instructor: Jeffery Underwood

Office: Hours/Location: 0900-1000 MWF; 1300-1500 T; Science 174

Telephone/Email: 278-2678; jeffery_underwood@csufresno.edu

Required Text/Readings: Ahrens, Donald. *Meteorology Today*. Sixth edition, West Publishing and Underwood, Jeffery. *Severe Weather*. Reading Packet. CSU Fresno Bookstore.

Course Structure

Following an introduction to the course, the basic elements of physical climatology, synoptic meteorology, hydroclimatology, and the climatology of atmospheric hazards are treated. The remainder of the course is devoted to a consideration of a number of types of violent weather and climatic hazards. Each type will be examined employing the following framework.

- introduction to the event/hazard
- analysis of the geography and spatial patterns of the event/hazard
- investigation of the physical processes involved in the creation of the event/hazard

- explanation of the conditions (surface and upper air) that contribute to the formation of the event/hazard
- examination of current analytical and forecast technology
- assessment of human impacts of the event/hazard
- consideration of case studies of the event/ hazard

Writing Requirement: All upper division General Education Courses have a 4000 word writing requirement including a significant sustained writing component. In this course the requirement will be satisfied as follows:

A major paper (at least 2000 words), addressing a topic appropriate to this course, will be due no later than Friday, December 1, 2000. You will receive a detailed assignment as a separate handout.

Four additional papers, each one a review of one of the papers included in the readings packet and each one about 500 words in length, will be due according to the following schedule: Paper 1 September 29, Paper 2 October 20, Paper 3 November 10, and Paper 4 December 8. More detailed information will be provided in a separate handout.

Course Grading: Grades will be based on examinations, written assignments, and class participation weighted as follows:

Mid-Term Examination	30%
Written Assignments	30%
Class Participation	10%
Final Examination	30%

Cheating and Plagiarism: “Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving a grade or obtaining course credit.” “Plagiarism is a specific form of cheating that consists of the misuse of the published and/or unpublished works of others by misrepresenting the material so used as one’s own work.” Students are expected to do their own work and instances of alleged or suspected cheating or plagiarism will be dealt with according to University policy.

Students with Disabilities: Students with disabilities should identify themselves to the instructor so that reasonable accommodations for learning and evaluation can be made. It is also recommended that students with disabilities contact the office of Services for Students with Disabilities in the Madden Library.

Course Outline

A. Topic: Introduction to Violent and Dangerous Weather and Climatic Hazards
Approximately one week

Assignments: Readings Packet, Chapter 1—"Severe Weather and Associated Hazards"

B. Topic: Physical Climatology Approximately two weeks

Radiation
Temperature
Atmospheric Moisture
Atmospheric Stability
Precipitation
Atmospheric Pressure/Density
Motion in the Atmosphere/Wind

Assignments: Ahrens, Chapters 2 and 3; Readings Packet, Chapter 2—"Radiation Laws"

C. Topic: Synoptic Meteorology Approximately two weeks

Scale of Atmospheric Phenomena
Patterns of Atmospheric Circulation
Air Masses and Weather
Cyclones and Anticyclones

Assignments: Ahrens, Chapters 12 and 13; Readings Packet, Chapter 3—"Synoptic Patterns in the Westerlies"

D. Topic: Hydroclimatology Approximately one week

Precipitation Patterns
Precipitation
Precipitation Types
Climatological Context for Flooding

Assignments: Ahrens, Chapters 5, 6, and 8; Readings Packet, Chapter 4—"Flood Hydrology"

E. Topic: Thunderstorms Approximately one week

Definition/Description
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Violent/Dangerous Thunderstorms
Technology/Data/Methods Employed in the Analysis of Thunderstorms
Case Studies/Human Impacts/Ethical Issues

Assignments: Ahrens, Chapters 7 and 15

F. Topic: Straight-Line Winds Approximately one week

Definition/Description
Geography and Spatial Patterns

Physical Processes

Anomalous Conditions Leading to Destructive Straight-Line Winds
Technology/Data/Methods Employed in the Analysis of Straight-Line Winds

Case Studies/Human Impacts/ Ethical Issues

Assignment: Ahrens, Chapter 15; Readings Packet, Chapter 5, “Wind Storms”

Midterm Examination: October 20, 2000

G. Topic: Lightning Approximately one week

Definition/Description

Geography and Spatial Patterns

Physical Processes

Anomalous Conditions Leading to Dangerous Lightning Storms

Technology/Data/Methods Employed in the Analysis of Lightning

Case Studies/Human Impacts/Ethical Issues

Assignment: Ahrens, Chapter 15; Readings Packet, Chapter 6—
“Lightning: Process and Hazard”

H. Topic: Tornadoes Approximately one week

Definition/Description

Geography and Spatial Patterns

Physical Processes

Anomalous Conditions Leading to Tornadoes

Technology/Data/Methods Employed in the Analysis of Tornadoes

Case Studies/Human Impacts/Ethical Issues

Assignment: Ahrens, Chapters 14 and 15

I. Topic: Tropical Cyclones/Hurricanes Approximately one week

Definition/Description

Geography and Spatial Patterns

Physical Processes

Anomalous Conditions Leading to Tropical Cyclogenesis

Technology/Data/Methods Employed in the Analysis of Tropical Cyclones

Case Studies/Human Impacts/Ethical Issues

Assignment: Ahrens, Chapter 16; Readings Packet, Chapter 7—“Tropical Weather: Hurricanes”

J. Topic: Flooding Approximately one week

Definition/Description

Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Flooding
Technology/Data/Methods Employed in the Analysis of Flooding
Case Studies/Human Impacts/Ethical Issues

Assignment: Readings Packet, Chapter 8—"Anomalous Atmospheric Circulation and Flooding"

- K. Topic: Heat Waves and Drought Approximately one week
Definitions/Descriptions/Relationships
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Heat Waves and Drought
Technology/Data/Methods Employed in the Analysis of Heat Waves and Drought
Case Studies/Human Impacts/Ethical Issues

Assignment: Readings Packet, Chapter 9—"Anticyclones and Associated Weather"

- L. Topic: Frozen Precipitation Approximately one week
Definitions/Description of Types
Geography and Spatial Patterns
Physical Processes
Anomalous Conditions Leading to Hazardous Frozen Precipitation
Technology/Data/Methods Employed in the Analysis of Dangerous Frozen Precipitation
Case Studies/Human Impacts/ Ethical Issues

Assignment: Readings Packet, Chapter 10—"Frozen Precipitation: Snow, Sleet, Freezing Rain, and Hail"

- M. Course Summary and Final Discussion Topics
Elements Common to Hazardous Climatologies
Changing Patterns of Climatic Hazards
Human Induced Climatic Hazards
Future Technologies and the Study of Severe Weather and Climatic Hazards

Final Examination--Monday, December 18, 2000, 1100-1300