

Washtenaw Community College Comprehensive Report

GLG 104 Weather Effective Term: Spring/Summer 2020

Course Cover

Division: Math, Science and Engineering Tech

Department: Physical Sciences

Discipline: Geology

Course Number: 104

Org Number: 12330

Full Course Title: Weather

Transcript Title: Weather

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Consultation with all departments affected by this course is required.

Outcomes/Assessment

Other:

Rationale: This revision is to update the master syllabus for this course to align with the results of the Winter 2019 assessment.

Proposed Start Semester: Winter 2020

Course Description: This course is an introductory study of the atmosphere which includes both weather and climate. This course introduces the student to basic concepts involved in the analysis of weather phenomena and atmospheric processes on a global and local scale. Fundamental weather principles will be examined, such as solar radiation, temperature, moisture, pressure, winds, and weather systems. Current weather data is delivered via the internet, which is coordinated with learning activities. Broad aspects of climates, local microclimatology and climate change will also be integrated.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 **Student:** 45

Lab: Instructor: 45 **Student:** 45

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Level 3

Requisites

General Education

MACRAO

MACRAO Science & Math

MACRAO Lab Science Course

General Education Area 4 - Natural Science

Assoc in Applied Sci - Area 4

Assoc in Science - Area 4

Assoc in Arts - Area 4

Michigan Transfer Agreement - MTA

MTA Lab Science

Request Course Transfer

Proposed For:

Central Michigan University

Eastern Michigan University

Ferris State University

Grand Valley State University

Michigan State University

Oakland University

University of Detroit - Mercy

University of Michigan

Wayne State University

Western Michigan University

Student Learning Outcomes

1. Recognize and identify principles and concepts of weather and climate.

Assessment 1

Assessment Tool: Outcome-related questions on departmental exams

Assessment Date: Winter 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: Random sample of 50% of students from each section with a minimum of one full section.

How the assessment will be scored: Multiple-choice questions will be scored using the key.

Essay and short answer questions will be scored using a departmentally-developed rubric.

Standard of success to be used for this assessment: 70% of students will score an overall average of 72.5% or better on the outcome-related questions on the departmental exams.

Who will score and analyze the data: Appropriate geology faculty will analyze the data.

2. Apply appropriate principles to solve problems as well as construct and interpret weather maps and graphs.

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Who will score and analyze the data: Appropriate geology faculty will analyze the data.

Course Objectives

1. Distinguish weather from climate.
2. Define the makeup and percentage of gases in the atmosphere.
3. Given a structural diagram of the atmosphere, identify layers of the atmosphere based on characteristics unique to each layer and temperature changes found within them.
4. Identify the sources of temperature variations with altitude.
5. Describe the concerns and causes for ozone depletion.
6. Identify the origin of free oxygen in the atmosphere.
7. Explain how pressure varies with altitude.
8. Construct and interpret temperature vs. air pressure curves on a graph.
9. Identify the principal motions of the Earth, based on the characteristics of rotation, revolution and precession.
10. List the two reasons for the variation in solar energy reaching locations on Earth causing Earth's seasons.
11. Identify the seasons (in both hemispheres) by date, hours of sunlight received and the axial tilt of the Earth.
12. Using the electromagnetic spectrum, compare and contrast the long-wave radiation emitted from the Earth to the short-wave radiation emitted from the Sun.
13. Explain the current natural and anthropologically-based theories that provide possible causes of climate change.
14. Define the Greenhouse Effect, listing the positive and potential negative outcomes of the effect on Earth.
15. Identify the principal greenhouse gases and their common sources.
16. View and critique a video on climate change.
17. Identify possible outcomes of increased global warming and their effects on humans and the environment.
18. List possible climate change solutions, including both individual and global efforts.
19. Explain the Milankovitch Theory and how it relates to climate change on Earth.
20. Identify possible outcomes of ice ages and their effects on humans and the environment.
21. Using statistical charts, interpret past climate change patterns on Earth and predict probable future climatic changes.
22. Distinguish heat from temperature.
23. Mathematically calculate and convert Fahrenheit, Celsius and Kelvin temperatures.
24. State and explain the five controls of temperature and how they affect the temperature of various locations around Earth.
25. Calculate temperature ranges.
26. Using the heat and wind-chill indexes, explain how they relate human perception to temperature.
27. Construct and explain isothermal maps.
28. Define dew point, relative humidity, condensation nuclei and saturation.
29. Using data from a psychrometer and related charts, calculate relative humidity and dew points.
30. Identify and explain the four lifting mechanisms that cause air to rise.
31. Calculate the temperature and relative humidity of a rising or falling parcel of air.
32. Compare and contrast conditionally and unconditionally stable and unstable air.
33. Construct and interpret temperature vs. relative humidity curves on a graph.
34. Explain the various processes involved in the hydrologic cycle.
35. Describe and calculate the amount of calories gained or lost as water changes state.
36. Identify the various changes in the state of water as either heating or cooling processes.
37. Define and explain the mechanisms creating cloud formation.
38. Compare and contrast the mechanics of the collision coalescence and the Bergeron processes.
39. Using pictures and descriptions, identify common clouds and their associated weather.
40. Identify precipitation types based on descriptions and temperature conditions.
41. Distinguish the various fog types by description.
42. Record daily weather observations for a period of one month.

43. Define air pressure as related to meteorology.
44. Explain how barometers and altimeters are used in meteorology.
45. Identify the two factors that largely determine the amount of air pressure exerted by an air mass.
46. List five differences between high and low pressure centers.
47. State and explain what causes wind using pressure gradient, Coriolis Effect and friction.
48. List and define the three classifications of global wind.
49. Sketch and label the mechanics of sea and land breezes.
50. Explain monsoonal circulation, and give examples.
51. Compare and contrast El Nino and La Nina.
52. Identify and label global winds and pressure zones on Earth.
53. Compare and contrast each of the air masses.
54. State and describe the two air masses that most influence Michigan's weather.
55. Use maps to identify the origin and movement of air masses affecting the United States.
56. Describe and interpret various weather-related symbols on weather maps.
57. Using appropriate symbols and colors, sketch and label the four types of weather fronts.
58. Explain the process of cyclogenesis (midlatitude cyclone formation).
59. Using weather maps, locate positions of fronts, air pressure zones, cyclones and anticyclones; also, state past, current and future weather for given locations on a weather map.
60. Using data collected in the weather observations project, determine cyclone, anticyclone, air mass and frontal passages.
61. Sketch, label and describe all stages of thunderstorm development.
62. State and explain the meteorological conditions that create tornadoes and hurricanes.
63. Discuss the safety implications and measures to be taken during a tornado watch and warning.
64. Plot the path for a hurricane, and estimate landfall.
65. Determine the category rank of hurricanes using the Saffir-Simpson scale.

New Resources for Course

Course Textbooks/Resources

Textbooks

American Meteorological Society (AMS). *Weather Studies Textbook and Investigations Manual Package 2019-2020*, Changes Annually ed. NYC: American Meteorological Society (AMS), 2020, ISBN: 9781944970468.

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Computer workstations/lab

TV/VCR

Data projector/computer

Reviewer

Action

Date

Faculty Preparer:

Suzanne Albach

Faculty Preparer

Sep 10, 2019

Department Chair/Area Director:

Suzanne Albach

Recommend Approval

Sep 10, 2019

Dean:

Victor Vega

Recommend Approval

Sep 17, 2019

Curriculum Committee Chair:

Lisa Veasey

Recommend Approval

Nov 04, 2019

Assessment Committee Chair:

Shawn Deron

Recommend Approval

Nov 08, 2019

Vice President for Instruction:

Kimberly Hurns

Approve

Nov 08, 2019

Washtenaw Community College Comprehensive Report

GLG 104 Weather Effective Term: Fall 2012

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Department: Physical Sciences

Discipline: Geology

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Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Credit hours

Total Contact Hours

Outcomes/Assessment

Objectives/Evaluation

Rationale: There are several purposes for updating the master syllabus: to streamline the curriculum for both the on-campus and online sections of GLG104, to increase the overall credits from three to four credits so that the course may be included in the MACRAO agreement as a lab science (this will help this class transfer to area four-year institutions), to allow more credit for an already lab intensive course, and to increase overall enrollment.

Proposed Start Semester: Fall 2012

Course Description: This course is an introductory study of the atmosphere which includes both weather and climate. This course introduces the student to basic concepts involved in the analysis of weather phenomena and atmospheric processes on a global and local scale. Fundamental weather principles will be examined, such as: solar radiation, temperature, moisture, pressure, winds, and weather systems. Current weather data is delivered via the internet, which is coordinated with learning activities. Broad aspects of climates, local microclimatology and climate change will also be integrated.

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Assessment Tool: Departmental Exams

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Matched Outcomes

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American Meteorological Society (AMS). *Weather Studies Investigations Manual 2011-2012 and Summer 2012*, 2011-2012 ed. NYC: American Meteorological Society (AMS), 2011, ISBN: 978-1-878220-.

Manuals

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Equipment/Facilities

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Data projector/computer

Reviewer

Faculty Preparer:

Suzanne Albach

Department Chair/Area Director:

Kathleen Butcher

Action

Faculty Preparer

Recommend Approval

Date

Mar 21, 2012

Mar 27, 2012

Dean:

Martha Showalter

Recommend Approval

Mar 28, 2012

Vice President for Instruction:

Stuart Blacklaw

Approve

Apr 11, 2012