

Washtenaw Community College Comprehensive Report

GLG 110 Geology of the National Parks and Monuments Effective Term: Fall 2024

Course Cover

College: Math, Science and Engineering Tech

Division: Math, Science and Engineering Tech

Department: Physical Sciences

Discipline: Geology

Course Number: 110

Org Number: 12330

Full Course Title: Geology of the National Parks and Monuments

Transcript Title: Geol Nat'l Parks & Monuments

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.

Course description

Outcomes/Assessment

Objectives/Evaluation

Rationale: To update the course description, outcomes, and objectives of this course based on the course assessment results and other changes since the inception of the course.

Proposed Start Semester: Winter 2024

Course Description: In this introductory course, students will develop a fundamental understanding of geology through the exploration of geologic formations present in various U.S. national parks and monuments. Highlighting the significance of geoheritage and responsible environmental stewardship, the course will use the geology found in our parks as examples to learn about various geological topics such as rocks, fossils, geologic time and dating, weathering and erosion, plate tectonics, and the impacts of climate change.

Course Credit Hours

Variable hours: No

Credits: 3

Lecture Hours: Instructor: 45 Student: 45

Lab: Instructor: 0 Student: 0

Clinical: Instructor: 0 Student: 0

Total Contact Hours: Instructor: 45 Student: 45

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 2

Requisites

General Education

MACRAO

MACRAO Science & Math

MACRAO not WCC Gen Ed

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 Science (no lab)

Request Course Transfer

Proposed For:

Eastern Michigan University

Ferris State University

Grand Valley State University

Jackson Community College

Kendall School of Design (Ferris)

Lawrence Tech

Michigan State University

Oakland University

University of Detroit - Mercy

University of Michigan

Wayne State University

Western Michigan University

College for Creative Studies

Central Michigan University

Student Learning Outcomes

1. Recognize and identify introductory principles and concepts of the geology and Earth sciences, as exposed and developed in various national parks and monuments of the United States.

Assessment 1

Assessment Tool: Outcome-related questions on departmental exams

Assessment Date: Winter 2026

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Multiple-choice questions will be scored using an answer 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 70% or higher

Who will score and analyze the data: Departmental faculty

2. Connect and correlate appropriate knowledge, principles, and concepts to synthesize the geologic information contained within individual parks, and extrapolate to broader geographical areas.

Assessment 1

Assessment Tool: Outcome-related questions on departmental exams

Assessment Date: Winter 2026

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Multiple-choice questions will be scored using an answer 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 70% or higher
 Who will score and analyze the data: Departmental faculty

3. Explain the geology and geologic history of a natural feature in a national park or monument not covered in the course material.

Assessment 1

Assessment Tool: Outcome-related assignment

Assessment Date: Winter 2026

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students will score 70% or higher

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Summarize the history and recognize the significance and role of the National Park Service (NPS) and geoheritage in preserving natural and cultural resources.
2. Assess the challenges faced by the National Park Service in safeguarding geoheritage sites and propose potential strategies to enhance their efforts for future generations.
3. Differentiate the three primary rock types found in the rock cycle and explain how they relate to minerals.
4. Explain the processes involved in fossil formation and preservation, as well as recognize the importance of fossils in unraveling the geologic history specific to the locations where they are discovered.
5. Identify and distinguish the major periods and eras of the geologic time scale.
6. Employ geologic dating techniques to interpret and explain geologic histories from various rock formations, landscapes, and fossil records found within our park system.
7. Correlate and connect the Grand Canyon, Zion, and Bryce Canyon National Parks to discuss their significance and contribution to our broader understanding of the geologic history and evolution of the Colorado Plateau Province.
8. Evaluate and discuss where Arches, Petrified Forest, and Dinosaur National Parks fit into the broader evolutionary history of the Colorado Plateau.
9. Identify various agents of weathering and erosion that shape and create geological features.
10. Explain the influence of rivers and streams in shaping landscapes and creating both depositional and erosional geological features within our national parks and monuments.
11. Identify various depositional and erosional cave and karst landscape formations in our national parks and monuments and explain the role of groundwater in their formation.
12. Describe various depositional and erosional glacial features and explain the role of glaciers and glaciation in shaping the landscapes of park regions.
13. Identify and explain various depositional and erosional aeolian (wind) geological features such as dunes and crossbedding and explain how wind creates diverse rock formations and landscapes within our park system.
14. Summarize the principles of plate tectonics and how they relate to the geological features observed in our national parks and monuments.
15. Compare and contrast geologic features of in U.S. national parks and monuments and explain the plate tectonic forces and surface processes that combine to create unique landscapes.
16. Explain the role and provide examples of transforming plate tectonic boundaries in shaping the geology of national parks and monuments.
17. Summarize the role and provide examples of continental rift plate tectonic boundaries in shaping the geology of national parks and monuments.
18. Explain the role and provide examples of passive plate tectonic boundaries in shaping the geology of national parks and monuments.

19. Recognize the role and provide examples of plate tectonic boundaries involving subduction in shaping the geology of national parks and monuments.
20. Explain the role and provide examples of accretion at plate tectonic boundaries in shaping the geology of national parks and monuments.
21. Explain the role and provide examples of volcanism at plate tectonic boundaries and how it plays a role in shaping the geology of national parks and monuments.
22. Explain the evolution of an active margin magmatic system, from ancient lower crust to active magmatic systems and identify which stage Yosemite, Lassen Volcanic, and Mount Rainier National Parks each represent of an active margin magmatic system.
23. Outline the role and provide examples of continental collision plate tectonic boundaries in shaping the geology of national parks and monuments.
24. Summarize the role and provide examples of hotspots in shaping the geology of national parks and monuments.
25. Compare and contrast the active margin magmatic system as exposed and developed in Yosemite, Lassen Volcanic, and Mount Rainier National Parks to a hot spot magmatic system as found in Yellowstone National Park.
26. Compare and contrast the volcanic formation and features of Hawai'i Volcanoes National Park to Yellowstone National Park.

New Resources for Course

Course Textbooks/Resources

Textbooks

OER. *Geology of National Parks*, ed. OER, 2023

Manuals

Periodicals

Software

Equipment/Facilities

Level I classroom

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Suzanne Albach</i>	<i>Faculty Preparer</i>	<i>Aug 01, 2023</i>
Department Chair/Area Director: <i>Suzanne Albach</i>	<i>Recommend Approval</i>	<i>Aug 01, 2023</i>
Dean: <i>Tracy Schwab</i>	<i>Recommend Approval</i>	<i>Aug 04, 2023</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Feb 14, 2024</i>
Assessment Committee Chair: <i>Jessica Hale</i>	<i>Recommend Approval</i>	<i>Feb 16, 2024</i>
Vice President for Instruction: <i>Brandon Tucker</i>	<i>Approve</i>	<i>Feb 19, 2024</i>

Washtenaw Community College Comprehensive Report

GLG 110 Geology of the National Parks and Monuments Effective Term: Winter 2020

Course Cover

Division: Math, Science and Engineering Tech

Department: Physical Sciences

Discipline: Geology

Course Number: 110

Org Number: 12330

Full Course Title: Geology of the National Parks and Monuments

Transcript Title: Geol Nat'l Parks & Monuments

Is Consultation with other department(s) required: No

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

Reason for Submission: Course Change

Change Information:

Course description

Credit hours

Total Contact Hours

Pre-requisite, co-requisite, or enrollment restrictions

Outcomes/Assessment

Objectives/Evaluation

Other:

Rationale: This course is being revised to update the course description, credit hours, objectives, and outcomes to provide students with a robust science-based geology course.

Proposed Start Semester: Winter 2020

Course Description: In this course, students will be introduced to the fundamental geological processes and concepts that created the parks and monuments of the United States. The course will explore the various geologic features through time, preserved by the National Park Service, with a focus on the interconnectivity and evolution of various systems that led to these geologic formations.

Course Credit Hours

Variable hours: No

Credits: 3

Lecture Hours: Instructor: 45 Student: 45

Lab: Instructor: 0 Student: 0

Clinical: Instructor: 0 Student: 0

Total Contact Hours: Instructor: 45 Student: 45

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 2

Requisites

General Education

MACRAO

MACRAO Science & Math

MACRAO not WCC Gen Ed

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 Science (no lab)

Request Course Transfer

Proposed For:

Central Michigan University

College for Creative Studies

Eastern Michigan University

Ferris State University

Grand Valley State University

Jackson Community College

Kendall School of Design (Ferris)

Lawrence Tech

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 introductory principles and concepts of the geology and Earth sciences, as exposed and developed in various national parks and monuments of the United States.

Assessment 1

Assessment Tool: Outcome-related questions on departmental exams

Assessment Date: Winter 2023

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Multiple-choice questions will be scored using an answer 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 the students will score an average of 72.5%, or better, on each exam. An item analysis of outcome-related questions will be done to identify areas of strengths and weaknesses.

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

2. Connect and correlate appropriate knowledge, principles, and concepts to synthesize the geologic information contained within individual parks, and extrapolate to broader geographical areas.

Assessment 1

Assessment Tool: Outcome-related questions on departmental exams

Assessment Date: Winter 2023

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Multiple-choice questions will be scored using an answer 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 the students will score an average of 72.5%, or better, on each exam. An item analysis of outcome-related questions will be done to identify areas of strengths and weaknesses.

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

3. Write a research paper that describes the geologic and cultural history of a national park not covered in the course material.

Assessment 1

Assessment Tool: Research paper

Assessment Date: Winter 2023

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Research paper will be scored using a departmentally-developed rubric.

Standard of success to be used for this assessment: 70% of the students will score a 2.5 (between acceptable and good), or above on a rubric scale of not acceptable (1), acceptable (2), good (3), and exemplary (4).

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

Course Objectives

1. Summarize the history and creation of the National Park System in the United States.
2. Identify the fundamental concepts of rock identification.
3. Describe the processes of plate tectonics, mountain building, and geologic sequences.
4. Explain the rock cycle and identify the three primary rock types in the rock cycle.
5. Describe how plate tectonics, mountain building, and deposition fit into the rock cycle.
6. Explain the techniques of relative and absolute age dating; compare and contrast their applications.
7. Identify the major periods and eras of the geologic time scale.
8. Relate the history and formation of Grand Canyon National Park through its geologic layering, materials, topographic features, and important evolutionary events.
9. Relate the history and formation of Zion National Park through its geologic layering, materials, topographic features, and important evolutionary events.
10. Relate the history and formation of Bryce Canyon National Park through its geologic layering, materials, topographic features, and important evolutionary events.
11. Compare and contrast the scale and significance of the features exposed in the Grand Canyon, Zion, and Bryce Canyon National Parks.
12. Correlate and connect the Grand Canyon, Zion and Bryce Canyon National Parks to discuss their significance and contribution to our broader understanding of the geologic history and evolution of the Colorado Plateau Province.
13. Evaluate and discuss where Arches, Petrified Forest, and Dinosaur National Parks fit into the broader evolutionary history of the Colorado Plateau.
14. Relate the history and formation of Rocky Mountain National Park through its geologic layering, materials, topographic features, and important evolutionary events.
15. Relate the history and formation of Glacier National Park through its geologic layering, materials, topographic features, and important evolutionary events.
16. Relate the history and formation of Grand Teton National Park through its geologic layering, materials, topographic features, and important evolutionary events.
17. Correlate and connect the Rocky Mountain, Glacier, Grand Teton National Parks to discuss their significance and contribution to our broader understanding of the geologic history and evolution of the region.

18. Relate the history and formation of Yellowstone National Park through its geologic layering, materials, topographic features, and important evolutionary events.
19. Propose a geologic process that better explains how Yellowstone National park better fits in the geologic history and evolution of the Rocky Mountains province.
20. Evaluate how Dinosaur National Monument fits into both the Colorado Plateau and Rocky Mountain Provinces and provides supporting data and limitations on whether Dinosaur National Monument can be used to link the histories of the two provinces.
21. Relate the history and formation of Yosemite National Park through its geologic layering, materials, topographic features, and important evolutionary events.
22. Relate the history and formation of Lassen Volcanic National Park through its geologic layering, materials, topographic features, and important evolutionary events.
23. Relate the history and formation of Mount Rainier National Park through its geologic layering, materials, topographic features, and important evolutionary events.
24. Recall that Yosemite, Lassen Volcanic, and Mount Rainier National Parks each represent different aspects of an active margin magmatic system.
25. Connect the evolution of an active margin magmatic system, from ancient lower crust to active magmatic systems.
26. Compare and contrast the active margin magmatic system as exposed and developed in Yosemite, Lassen Volcanic, and Mount Rainier National Parks to a hot spot magmatic system as found in Yellowstone National Park.
27. Relate the history and formation of Isle Royale National Park through its geologic layering, materials, topographic features, and important evolutionary events.
28. Relate the history and formation of Pictured Rocks National Park through its geologic layering, materials, topographic features, and important evolutionary events.
29. Relate the history and formation of Sleeping Bears Dunes National Lakeshore through its geologic layering, materials, topographic features, and important evolutionary events.
30. Analyze the various impacts of glacial erosional and depositional processes on Isle Royale National Park, Pictured Rocks National Park, and Sleeping Bear Dunes National Lakeshore, and how these same processes also influenced the landscape and topography of Michigan.
31. Relate the history and formation of Hawai'i Volcanoes National Park through its geologic layering, materials, topographic features, and important evolutionary events.
32. Compare and contrast the volcanic formation and features of Hawai'i Volcanoes National Park to Yellowstone National Park.
33. Relate the history and formation of Mammoth Caves National Park through its geologic layering, materials, topographic features, and important evolutionary events.
34. Relate the history and formation of Guadalupe Mountains National Park through its geologic layering, materials, topographic features, and important evolutionary events.
35. Write a research paper on a national park not already covered in the course, including a summary of the creation of the park, the geological history, the evolution of the park, and any important geological or topographical features.

New Resources for Course

Course Textbooks/Resources

Textbooks

Foster, D., Hacker, D., Harris, A.. *Geology of National Parks*, 7 ed. Kendall Hunt, 2019, ISBN: 9781465291004.

Manuals

Periodicals

Software

Equipment/Facilities

Level I classroom

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Suzanne Albach</i>	<i>Faculty Preparer</i>	<i>Aug 13, 2019</i>
Department Chair/Area Director: <i>Suzanne Albach</i>	<i>Recommend Approval</i>	<i>Aug 13, 2019</i>
Dean: <i>Victor Vega</i>	<i>Recommend Approval</i>	<i>Sep 17, 2019</i>
Curriculum Committee Chair: <i>Lisa Veasey</i>	<i>Recommend Approval</i>	<i>Nov 04, 2019</i>
Assessment Committee Chair: <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Nov 08, 2019</i>
Vice President for Instruction: <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Nov 08, 2019</i>