

# **GEO 333: GEOGRAPHY OF MICHIGAN & THE GREAT LAKES REGION**

## Spring Semester, 2023

Instructor: Dr. **Randall Schaetzl**

Office: 128 Geography Building

email: [soils@msu.edu](mailto:soils@msu.edu)

Class time/place: M, W in Room N102 Business Complex, from 10:20-11:40 am

Office Hours: M and W, from *after our class* until about 1:00 pm, or by appointment, or just stop by!

Mailbox: 106 Geography Bldg.

Contacts, emergency or otherwise: Ph. 517-353-7726 (office)

648-0207 (cell)      347-0164 (home)    -- please, no calls after 9 pm

**Course Goals:** GEO 333 is intended for students who want an overview of the geography of Michigan. Emphasis will be on the *physical* resources of the state, and how *humans have utilized* those resources. Geographic patterns - their occurrence, relevance, and influence on human society - will be stressed, and in order to better comprehend and follow the lectures, knowledge of geographic patterns and basic place names in Michigan is expected. The course has no prerequisites.

**Text:** Schaetzl, R.J., Darden, J.T. and D. Brandt. (editors) 2009. Michigan Geography and Geology. Pearson Custom Publishing, Boston, MA. **Recommended**

**Coursepack:** Geography of Michigan coursepack and lecture materials. Available only at the Student Bookstore. This coursepack is **required** for all GEO 333 students.

**Other Resources:** Web page (bookmark it!): <https://project.geo.msu.edu/geogmich/> Material for a given lecture may not all be on one page, but may be scattered throughout a few different sections of the web page. See the course outline (below) for details.

**Lectures:** Live and in-person. Because so much of the material in this class is NOT available in a textbook or even on the web page, missed lecture material is not easy to make up. Please attend class as often as you can. I nonetheless reserve the right to post short "video lectures" on D2L, should I fall behind this schedule.

**Posted D2L resources:** Most everything you need (figures, graphics, maps, data) to succeed in this class is IN THE COURSEPACK. Thus, I will not be posting powerpoint slides on D2L. As mentioned above, I will occasionally post a short video lecture to D2L, to help me stay on the schedule listed below.

**Exams:** Four exams and two quizzes will be given in GEO 333, with their point values shown below. The exams contain a mix of various types of questions, some T/F and multiple choice questions, as well as some open-ended, short answer/short essay questions. Many of the questions will focus on an image, map, or some sort of visual – the student will be asked a question about what is being shown. Please LEARN and KNOW the materials as well as you can prior to the exam so that you can move through the questions as quickly as possible. Students will have the full classtime to complete each exam. Students will not be allowed to turn in their exam or quiz without first presenting a valid MSU ID or another form of identification with a photo on it. There will be no exceptions to this policy!

|                           |  |
|---------------------------|--|
| Quiz 1:                   | 40 pts   |
| Quiz 2:                   | 60 pts   |
| First exam:               | 100 pts (includes all material covered since Day 1)              |
| Second exam:              | 100 points (includes all material covered since Day 1)           |
| Third exam:               | 90 points (includes only material covered since the second exam) |
| Fourth exam:              | 90 points (includes all material covered since the second exam)  |
| End of lecture questions: | 20 points (your ten best scores, out of 12 possible)             |
| <b>TOTAL:</b>             | <b>500 points possible in GEO 333</b>                            |

Using your point total, your “percentage” will be calculated and rounded to the nearest tenth of a percentile. Based on that number, a final course grade will be assigned, using the grade scale shown below.

87% or greater = 4.0

83% - 86.9% = 3.5

75% - 82.9% = 3.0

71% - 74.9% = 2.5

62% - 70.9% = 2.0

58% - 61.9% = 1.5

50% - 57.9% = 1.0

less than 50% is not passing. No exceptions.

**End of lecture questions.** Randomly, at the end of 12 lectures during the course of the semester, I will end the class 2-3 minutes early and post a 2-point question (or questions) on the screen. I call these “end of lecture” (EOL) questions. The question(s) will come from that day’s lecture, and the answer to it will be *easy*, if you are there and were paying attention. You MAY use your notes or the D2L materials to answer the question, but you may not discuss the answer with anyone or look at anyone else’s notes – no cheating. Each student will write their name, student number, and the answer to the question on a small piece of paper, and hand it to the TA. You’ll be emailed the EOL question results and your score. This is my way of promoting attendance and attention, and in turn, raising everyone’s grade. Each student will be allowed to drop their two lowest EOL scores, as a way of not penalizing someone who legitimately had to be absent. *There are no “make-ups” to EOL questions.*

**Quizzes.** The two quizzes will be given during the last 20-25 minutes of class. Quiz #1 will involve naming **all** the counties of Michigan on a county outline map. Quiz #2 will be similar to the first, except that identification will involve major cities, rivers, lakes, bays, islands and landforms. For each quiz, the number of correct answers will be determined and then that score will be adjusted, to arrive at a final grade out of 40 (1<sup>st</sup> quiz) or 60 (2<sup>nd</sup> quiz). There are no secrets as to what is on the quizzes. Here’s what you can expect:

QUIZ 1: You will be given a blank county outline map of Michigan and will be expected to fill in the name of each of Michigan’s 83 counties (names are not provided, spelling must be “very close” to be judged correct).

QUIZ 2: You will be given several blank maps of Michigan, and will be expected to fill in or identify physical and cultural features on the map.

RIVERS: Presque Isle, Ontonogan, Sturgeon (there are TWO of them, both in the UP; you need only find one), Michigamme, Menominee, Escanaba, Tahquamenon, Manistique, St. Joseph, Kalamazoo, Grand, Muskegon, Manistee, St. Marys, St. Clair, Detroit, Pere Marquette, Thunder Bay, Au Sable, Rifle, Tittabawassee, Shiawassee, Flint, Cass, Saginaw, Huron, Raisin, Black (the one in Sanilac County). The rivers are drawn on the map and the names are given; the student must match the correct number to the correct river.

LAKES (largest to smallest): St. Clair, Houghton, Torch, Burt, Charlevoix, Mullett, Gogebic, Portage, Crystal, Manistique, Black, Higgins, Hubbard, Indian. Locations are indicated on the maps but names are NOT given (spelling must be "close").

CITIES: Detroit, Grand Rapids, Lansing, Flint, Ann Arbor, Warren, Alpena, Traverse City, Houghton, Marquette, Munising, Battle Creek, Kalamazoo, Benton Harbor, St. Joseph, Muskegon, Ludington, Charlevoix, Gaylord, Bay City, Monroe, Midland, Saginaw, Port Huron, Sault Ste. Marie, Manistique, Escanaba, Ironwood, Iron Mountain, Jackson, Niles, Adrian, Cadillac, Mt. Pleasant, Menominee, Dearborn, Petoskey, Manistee. Cities are represented on the map as labeled dots, you must provide the name for each city/dot.

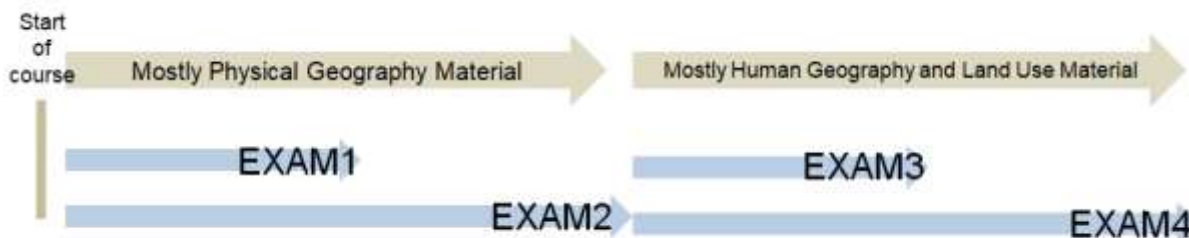
BAYS: Keweenaw Bay, Big Bay de Noc, Grand Traverse Bay, Whitefish Bay, Huron Bay, Thunder Bay, Saginaw Bay, Little Traverse Bay. Locations are indicated on the maps but names are NOT given (spelling must be close).

LANDFORMS: Huron Mountains, Garden Peninsula, Whitefish Point, St. Clair Delta, Seney Swamp, Keweenaw Range/Copper Country, Chippewa County Clay Plains, Sleeping Bear Dunes, SE Michigan Interlobate moraine, Grayling Fingers, Porcupine Mountains, Antrim-Charlevoix drumlin field, Menominee drumlin field, Leelanau peninsula. The landforms are drawn on the map and the names are given; the student must match the correct number to the correct landform.

ISLANDS: Less Cheneaux Islands, Beaver Island, North and South Manitou Islands, Mackinac Island, Bois Blanc Island, Isle Royale, Sugar Island, Neebish Island, Drummond Island. Locations are indicated on the maps but names are NOT given (spelling must be close).

**Exams.** Part I of this course is on its Physical Geography. The first exam – on basic hard rock geology of Michigan, focusing on the Michigan Geologic Basin - will cover material discussed since the beginning of the course. The second exam will be cumulative from the start of the course, but will focus on additional "geologic topics" that have been discussed since Exam 1. In essence, Exam 2 covers *all* of the Physical Geography topics.

Part II of this course is mainly on Human/Historical Geography, and land use patterns in the state. Exam 3 covers human geography topics, including Michigan's history. It does NOT include anything that we covered before Exam 2. The fourth exam - given during Finals week - will be cumulative on all material (mostly Human Geography and Land Use material) since Exam 2. See the graphic below for an illustration of all this.



The quizzes will be returned to you. However, only *parts* of the exams will be returned. We will go over those parts in a subsequent class. *If you miss an exam*, you will normally be assigned, for the missed exam, the average (percentage) grade from your other three exams - but **ONLY** provided that you have a valid excuse. Make-up exams are not given. If an exam is missed due to a family funeral, a newspaper obituary (with the date of the newspaper issue clearly shown) must be presented to the instructor within five class days of the missed exam or the student will receive a grade of zero for the exam.

## RELATED COURSES

GEO 208: Physical Geography of National Parks  
GEO 330: Geography of the United States  
GEO 410: Plant Geography  
GEO 407: Regional Geomorphology of the United States  
GEO 453: Metropolitan Environments  
GLG 302: Geology of Michigan  
FOR 101: Michigan's Forests  
FW 207: Great Lakes Biology and Management  
FW 284: Natural History and Conservation in Michigan  
HST 320: History of Michigan  
ISS 205: Big Ideas in Social Sciences  
PLB 218: Plants of Michigan  
PRR 100: Recreation in Michigan Natural Resources  
RD 440: Resource Development Public Policy Process in Michigan  
ZOL 361: Michigan Birds

(Please let me know if you have any additional suggestions for this list)

## Course outline

**Jan 9:** Introductory comments, course structure, goals and grading; the GEO 333 web page; geologic concepts  
[project.geo.msu.edu/geogmich/](http://project.geo.msu.edu/geogmich/)  
[project.geo.msu.edu/geogmich/part-one.html](http://project.geo.msu.edu/geogmich/part-one.html)  
BOOK chapter 1

**Jan 11:** Rocks; geologic time; the Precambrian Era in Michigan; new mining ventures in the UP!  
[project.geo.msu.edu/geogmich/part-two-A.html](http://project.geo.msu.edu/geogmich/part-two-A.html)

**Jan 16:** No class. MLK Day

**Jan 18 and 23:** The formation, discovery, and geography of Michigan's iron ranges; the geology of iron ore; history and development of iron mining  
The iron mining parts of this page: [project.geo.msu.edu/geogmich/part-five-G.html](http://project.geo.msu.edu/geogmich/part-five-G.html)  
[project.geo.msu.edu/geogmich/Marquette-iron-range.html](http://project.geo.msu.edu/geogmich/Marquette-iron-range.html)  
BOOK chapters 2, 3, and 11

**Jan 25:** The geography of iron and steel; the Soo Locks; shipping on the Great Lakes  
[project.geo.msu.edu/geogmich/part-five-E.html](http://project.geo.msu.edu/geogmich/part-five-E.html)  
The iron and steel parts of this page: [project.geo.msu.edu/geogmich/part-five-B.html](http://project.geo.msu.edu/geogmich/part-five-B.html)  
BOOK chapter 30

**Jan 30:** Moving iron ore to the steel mills. **Quiz #1**  
[project.geo.msu.edu/geogmich/iron\\_ore\\_\\_taconite.html](http://project.geo.msu.edu/geogmich/iron_ore__taconite.html)  
Examine the iron and steel parts of this page: [project.geo.msu.edu/geogmich/part-five-B.html](http://project.geo.msu.edu/geogmich/part-five-B.html)

**Feb 1:** Steelmaking: the end point of iron  
Examine the iron and steel parts of this page: [project.geo.msu.edu/geogmich/part-five-B.html](http://project.geo.msu.edu/geogmich/part-five-B.html)

**Feb 6:** Iron and steel; The Copper Range  
The copper parts of this page: [project.geo.msu.edu/geogmich/part-five-G.html](http://project.geo.msu.edu/geogmich/part-five-G.html)

**Feb 8:** Geology of the Copper Range and Isle Royale; History and development of copper mining

The Precambrian parts of this page: [project.geo.msu.edu/geogmich/part-two-A.html](http://project.geo.msu.edu/geogmich/part-two-A.html)

[project.geo.msu.edu/geogmich/copperrange.html](http://project.geo.msu.edu/geogmich/copperrange.html)

BOOK chapter 12

**Feb 13:** Sandstones of the UP; waterfalls, cuestas and the Michigan Paleozoic basin. **Quiz #2**

most everything beneath "Paleozoic Era" on this page: [project.geo.msu.edu/geogmich/part-two-A.html](http://project.geo.msu.edu/geogmich/part-two-A.html)

[project.geo.msu.edu/geogmich/niagara.html](http://project.geo.msu.edu/geogmich/niagara.html)

[project.geo.msu.edu/geogmich/picturerock.html](http://project.geo.msu.edu/geogmich/picturerock.html)

[project.geo.msu.edu/geogmich/waterfalls.html](http://project.geo.msu.edu/geogmich/waterfalls.html)

BOOK chapter 4

**Feb 15 and 20:** Early Paleozoic rocks of the Michigan basin; glass; Silurian rocks in the Michigan basin - a little bit of everything; limestone and cement; More Silurian wealth: hydrocarbons

[project.geo.msu.edu/geogmich/sandstones.html](http://project.geo.msu.edu/geogmich/sandstones.html)

[project.geo.msu.edu/geogmich/paleozoic\\_limestone.html](http://project.geo.msu.edu/geogmich/paleozoic_limestone.html)

[project.geo.msu.edu/geogmich/limestone\\_mining.html](http://project.geo.msu.edu/geogmich/limestone_mining.html)

[project.geo.msu.edu/geogmich/portland\\_cement.html](http://project.geo.msu.edu/geogmich/portland_cement.html)

[project.geo.msu.edu/geogmich/maxton\\_plains.html](http://project.geo.msu.edu/geogmich/maxton_plains.html)

Everything below the heading "Hydrocarbons (oil and gas)" on this page:

[project.geo.msu.edu/geogmich/part-five-G.html](http://project.geo.msu.edu/geogmich/part-five-G.html)

BOOK chapter 10

**Feb 22: Exam 1.**

**Feb 27:** Salt and brines; Devonian and Mississippian rocks in the Michigan basin; the story of Dow chemical; shale, clay and bricks

[project.geo.msu.edu/geogmich/evaporite.html](http://project.geo.msu.edu/geogmich/evaporite.html)

[project.geo.msu.edu/geogmich/dow.html](http://project.geo.msu.edu/geogmich/dow.html)

Everything below "salt" on this page: [project.geo.msu.edu/geogmich/part-five-G.html](http://project.geo.msu.edu/geogmich/part-five-G.html)

[project.geo.msu.edu/geogmich/shale\\_and\\_clay.html](http://project.geo.msu.edu/geogmich/shale_and_clay.html)

**Mar 1:** Exams back. Coal; gypsum; Major aquifers of the Michigan basin; the period of erosion and weathering;

[project.geo.msu.edu/geogmich/coal.html](http://project.geo.msu.edu/geogmich/coal.html)

[project.geo.msu.edu/geogmich/gypsummining.html](http://project.geo.msu.edu/geogmich/gypsummining.html)

[project.geo.msu.edu/geogmich/strat\\_column.html](http://project.geo.msu.edu/geogmich/strat_column.html)

[project.geo.msu.edu/geogmich/groundwater.html](http://project.geo.msu.edu/geogmich/groundwater.html)

BOOK chapter 16

**Mar 6-10:** Spring Break

**Mar 13:** Karst landscapes, sinkholes, and caves. PART-II: The last 2 million years; Glaciation: onset of the ice, major ice lobes; deglaciation [project.geo.msu.edu/geogmich/NE\\_MIkarst.html](http://project.geo.msu.edu/geogmich/NE_MIkarst.html)

The first five web pages listed on this page: [project.geo.msu.edu/geogmich/part-two-B.html](http://project.geo.msu.edu/geogmich/part-two-B.html)  
BOOK chapter 17

**Mar 15:** Continued retreat of the ice; end moraines, outwash plains and lake plains

The three-part-deglaciation sequence listed here:

[project.geo.msu.edu/geogmich/part-two-B.html](http://project.geo.msu.edu/geogmich/part-two-B.html)

[project.geo.msu.edu/geogmich/moraines.html](http://project.geo.msu.edu/geogmich/moraines.html)

[project.geo.msu.edu/geogmich/drumlins.html](http://project.geo.msu.edu/geogmich/drumlins.html)

**Mar 20:** Glacial sediments, proglacial lakes, and glacial landform regions. The Great Lakes in postglacial time

The pages associated with glacial lakes, on this page: [project.geo.msu.edu/geogmich/part-two-B.html](http://project.geo.msu.edu/geogmich/part-two-B.html)

The glacial landforms listed on this page: [project.geo.msu.edu/geogmich/part-two-C.html](http://project.geo.msu.edu/geogmich/part-two-C.html)

Many of the pages found here also are associated with glaciation:

[project.geo.msu.edu/geogmich/part-three.html](http://project.geo.msu.edu/geogmich/part-three.html)

[project.geo.msu.edu/geogmich/mackinacchannel.html](http://project.geo.msu.edu/geogmich/mackinacchannel.html)

[project.geo.msu.edu/geogmich/Autrain-whitefish.html](http://project.geo.msu.edu/geogmich/Autrain-whitefish.html)

[project.geo.msu.edu/geogmich/St.Clair-delta.html](http://project.geo.msu.edu/geogmich/St.Clair-delta.html)

BOOK chapter 13

**Mar 22:** Michigan's dunes and sand mining; The Great Lakes: diversions of water into and out of them; Coastal issues: how coasts function; coastal development and contemporary erosion problems

Many pages here have Great Lakes topics included within them:

[project.geo.msu.edu/geogmich/part-two-E.html](http://project.geo.msu.edu/geogmich/part-two-E.html)

Dunes are found on several pages here: [project.geo.msu.edu/geogmich/part-two-C.html](http://project.geo.msu.edu/geogmich/part-two-C.html)

Many pages here have Great Lakes topics included within them: [project.geo.msu.edu/geogmich/part-two-E.html](http://project.geo.msu.edu/geogmich/part-two-E.html)

BOOK chapters 4 and 18

**Mar 27: Exam 2**

This exam is cumulative – it includes all materials that we have covered to date.

**Mar 29:** Michigan History: The last 500 years; Native American Indians, French “invaders” and the British

All the pages within this one: [project.geo.msu.edu/geogmich/part-four-A.html](http://project.geo.msu.edu/geogmich/part-four-A.html)

Several pages within this one: [project.geo.msu.edu/geogmich/part-four-B.html](http://project.geo.msu.edu/geogmich/part-four-B.html)

BOOK chapters 26 and 27

**Apr 3:** Exams back. Early Michigan, statehood and the Toledo War; Michigan's external boundaries and internal land divisions

Several pages within this one: [project.geo.msu.edu/geogmich/part-four-B.html](http://project.geo.msu.edu/geogmich/part-four-B.html)

Parts of BOOK chapter 1

**Apr 5:** The USPLS system of land subdivision; Michigan fever; Lumbering: the start, its heyday and the end game; Post-lumbering issues; stumped wastelands; post-logging fires, the CCC

Several pages here: [project.geo.msu.edu/geogmich/part-four-B.html](http://project.geo.msu.edu/geogmich/part-four-B.html)

Lumbering era materials are all located here: [project.geo.msu.edu/geogmich/part-four-C.html](http://project.geo.msu.edu/geogmich/part-four-C.html)

[project.geo.msu.edu/geogmich/ccc.html](http://project.geo.msu.edu/geogmich/ccc.html)

[project.geo.msu.edu/geogmich/nationalforests.html](http://project.geo.msu.edu/geogmich/nationalforests.html)

Most of these pages: [project.geo.msu.edu/geogmich/part-five-D.html](http://project.geo.msu.edu/geogmich/part-five-D.html)

Some of the latter pages on this page are useful: [project.geo.msu.edu/geogmich/part-four-C.html](http://project.geo.msu.edu/geogmich/part-four-C.html)

BOOK chapters 28 and 40

**Apr 10: Exam 3.**

This exam covers only material SINCE Exam 2.

**Apr 12:** Michigan's population trends, migration; urban sprawl and the rural-urban transition

[project.geo.msu.edu/geogmich/cities.html](http://project.geo.msu.edu/geogmich/cities.html)

[project.geo.msu.edu/geogmich/city\\_character.html](http://project.geo.msu.edu/geogmich/city_character.html)

[project.geo.msu.edu/geogmich/land\\_conversion.html](http://project.geo.msu.edu/geogmich/land_conversion.html)

Some of these pages are pertinent: [project.geo.msu.edu/geogmich/part-four-F.html](http://project.geo.msu.edu/geogmich/part-four-F.html)

Some pages here as well: [project.geo.msu.edu/geogmich/part-four-E.html](http://project.geo.msu.edu/geogmich/part-four-E.html)

[project.geo.msu.edu/geogmich/cities\\_of\\_the\\_future.html](http://project.geo.msu.edu/geogmich/cities_of_the_future.html)

Some of these pages are more pertinent than others: [project.geo.msu.edu/geogmich/part-four-E.html](http://project.geo.msu.edu/geogmich/part-four-E.html)

BOOK chapters 32 and 34

**Apr 17:** Exams back. How we use Michigan's physical environment; Soils of Michigan; peat and muck, sod, soil quality

[project.geo.msu.edu/geogmich/part-two-D.html](http://project.geo.msu.edu/geogmich/part-two-D.html)

BOOK chapter 20

**Apr 19:** Major vegetation patterns in Michigan; post-lumbering changes and modern challenges; early agriculture

All of the pages here: [project.geo.msu.edu/geogmich/part-two-F.html](http://project.geo.msu.edu/geogmich/part-two-F.html)

BOOK chapter 21

**Apr 24 and 26:** Agriculture: early and later crop rotations; dairying and corn belt agriculture; Agriculture: specialty crops: dry beans, sugar beets, potatoes; Michigan climate and weather: factors and controls; Michigan's fruit belt and the "lake effect"

[project.geo.msu.edu/geogmich/agriculture\\_in\\_mi.html](http://project.geo.msu.edu/geogmich/agriculture_in_mi.html)

[project.geo.msu.edu/geogmich/settle.html](http://project.geo.msu.edu/geogmich/settle.html)

Don't ignore the many fine pages here: [project.geo.msu.edu/geogmich/part-five-C.html](http://project.geo.msu.edu/geogmich/part-five-C.html)

BOOK chapters 7, 19, 36, and 38

Lake effect and climate pages are here: [project.geo.msu.edu/geogmich/part-two-H.html](http://project.geo.msu.edu/geogmich/part-two-H.html)

Fruit pages are here: [project.geo.msu.edu/geogmich/part-five-C.html](http://project.geo.msu.edu/geogmich/part-five-C.html)

**May 4:** Exam 4. 7:45-9:45 am. The exam is in our regular classroom.

This exam covers only material SINCE Exam 2.