Physical Geology	Geol 1110-01 *(subject to change)*	Dr. Megan Jones

Lecture: 10:30-11:45 pm MW **Room:** SC-123; **Lab:** 1-3:50 pm **Room:** SC-105

Credit Hours: 4; fulfills MnTC goal area 3, Natural Science **Office**: SC 126-D

Telephone w/voice mail: 763-424-0869 **Email:** megan.jones@nhcc. edu

Office Hours: **Mon: 10-12 pm; Weds: 10-11 pm; Thurs: 12-1 pm; Starting 10/8 Tues: 5-6 pm**
Or by appointment, call or email to schedule.

Texts: *EARTH: Portrait of a Planet (3nd) Stephen Marshak, (2005), W.W. Norton & Co. Inc., New York*
Laboratory manual for Introductory Geology (1st) Allan Lundman & Stephen Marshak (2010) W.W. Norton

Other Materials: ruler, scientific calculator **(NOT GRAPHING!),** colored pencils (because they are fun)

Catalog Description: A course examining the earth's formation, composition, structure and natural systems. Including exploration of the earth's internal and external processes and how they shape the surface of the earth. Topics include: geologic time, plate tectonics, rock and mineral identification, introduction to topographic and geologic maps, surficial processes and environmental concerns. (3 hours lecture, 3 hours lab)

Extended Description: Welcome to Physical Geology! In this course, we will enhance our appreciation for the world around us by looking more closely at what the earth is made of and how the landscape around us is formed. In addition to increasing our knowledge of the earth around us, we will learn and practice many of the critical thinking skills that are commonly used in scientific investigation. We will begin by recognizing patterns through our reading, mapwork and examination of earth materials and learning to ask questions about what these patterns mean. In addition, we will practice testing our comprehension of new information by: 1) translating it into our own words, diagrams and/or graphs; 2) interpreting it under different circumstances; and 3) extending it into new situations and making predictions.

Course Goals and Objectives:

Overarching Goals for Course

1. Students will be able to ***evaluate geologic data/information by making observations*** and ***posing questions*** from which they will ***formulate hypotheses*** about how the data is related to or reflects earth materials, geologic features and/or processes.

2. Students will be able to ***integrate different types of data*** (e.g., quantitative data, topographic maps, geologic maps, cross-sections, stratigraphic columns, photographs, diagrams and/or tables, figures and graphs) to reconstruct scenarios that reflect the internal and/or surficial processes that create the widely varying landscapes that we see today and to evaluate potential hazards associated with them.

Objectives for the Course

Course objectives are concrete and measurable tasks that will help guide us move through the course and determine if the methods we use for learning are working. **Parts I-VI refer to Learning Objectives and Notetaking Guide I gave you on the first day. You will demonstrate the following in your questions, class participation, laboratory exercises, small group work, and your answers in tests**:

- the **use of the scientific method**, the **ability to recognize and describe** what science is & what it is not, how it works and what its place in society is today. (**Parts I-VI**)
- the thorough **comprehension** of the formation of the earth and solar system and to **recognize and explain the significance** of the layered structure and composition of the earth. (**Parts I & II**)
- the ***significance of how*** and ***why plate tectonics is the unifying theory of geology*** and to ***recognize and describe its influence in formation of earth materials and landscape construction***. (**Part II**)
- the ***ability to use*** and ***recognize basic geologic principles*** in maps, cross-sections, stratigraphic columns. (**Part V**)
- **recognition of the significance of geologic time** on the evolution of the earth and its processes. (**Parts I-VI**)
- to recognize the **significance of cyclicity** in earth systems interaction and be able to **describe interactions and make connections between various earth system cycles**. (**Parts II, III, IV, VI**)
- the ability to **recognize landforms** in model, diagram, photographic and map form and to **describe the surficial or internal processes** that created them. (**Part VI**)
- a **familiarity with the geologic time scale** and the **ability to use** the methods with which geologists determine the ages of rock layers and the geologic events they represent. (**Part V**)
- an **enhanced ability and confidence** in their **quantitative skills** such as reading and making graphs, **simple calculations** (e.g., rates, density and gradients), **converting units** from English system to Metric system, **reading maps and using map scales** to determine actual ground distances. (**Parts II, III, VI**)
- the ability to use the ***concept of classification*** with emphasis on the relationship between rock classification schemes and the origin of various rocks. (**Part III & IV**)
- the ability to ***make observations*** and ***recognize patterns*** in geologic information and to **demonstrate an understanding of how those patterns are related geologic processes or earth materials**. (**Parts I-VI**)
- the ability to use ***comprehension skills*** (e.g., ***translation***, ***interpretation*** and ***extrapolation) and synthesis and analysis skills*** in asking and answering geologic questions. (**Parts I-VI**)
- to **recognize and identify** the various levels of questioning through the use of specific key words and **relating these questions** to the necessary level of thinking required to answer them. (**Parts I-VI**)

Teaching Methods -- Read the following VERY CAREFULLY!!

This is a science with a lab course in which participation and discussion is not only encouraged but is built into the course through various activities. Small group work will be a significant part of the learning experience and will always take place during our classroom meetings. **If you are not here you cannot participate in small group activities. You cannot make up a group activity (you need to be in a group) and thus, will not get credit for that part of the exercise.**

We will embark on several video field excursions that will give you first hand examples of how the science of geology works. You will practice a lot of critical thinking, problem-solving and questioning skills as a result of some of the video field excursions. There will be some repetition between lectures, lab, the videos, and your reading which is intended to help you comprehend the material at the level necessary to move comfortably through the course, but on the whole they are designed to complement one another; thus reading the textbook, actively watching the videos & taking notes, and attendance is critical to success in this course. ***Because this course fulfills a lab requirement, in order to pass the course you must pass the lab portion with a 65% (104/160 points) or better.***
Do not blow off lab! Students have failed the course with passing lecture exam scores and a failing lab score!

Academic Dishonesty -- DON"T DO IT!!! Read the following VERY CAREFULLY!!

Any form of academic dishonesty will not be tolerated. This includes, **but is not limited to**: copying other students work and turning it in as your own, working together on assignments or tests that are NOT group exercises, copying the written work of others from books, internet, etc. and submitting as your own (aka plagiarism), giving your work to others to use and turn in as their own, and cheating of any kind on an exam or assignment. I take this very seriously! **You will receive a zero on the assignment and will be dropped one full letter grade for the course. In addition, a letter describing the incident will be placed in your academic file. Continued academic dishonesty will result in you being dropped from the course or receiving a grade of F for the course**. Take this seriously because I have an uncanny way to catching folks doing this stuff and it is no fun for me!

Academic Dishonesty – see the policy in the student handbook! Consequences for academic dishonesty (again) in the course will range from 0 on an assignment or test and dropped one full letter grade for the course to a stretching on the rack and/or a letter describing the incident placed in your academic file, or being dropped from course or receiving a grade of F for the course, if need be! I cannot stress how seriously I take this. As Professor Minerva McGonagall (one of my mentors) would say, "You have been warned!"

YOU ARE RESPONSIBLE FOR KNOWING AND AGREE TO FOLLOW POLICIES ON ACADEMIC DISHONESTY IN THE NHCC CODE OF STUDENT CONDUCT WHICH CAN BE FOUND IN THE STUDENT PLANNER THAT IS AVAILABLE ALL OVER CAMPUS.

Classroom Policies

Attendance: Class attendance is required. We will cover a lot of material and I am famous for making most of it easy to understand. If you are not present, you may have trouble comprehending and applying the material. In addition, there will be many in-class learning activities and if you are not present you cannot participate. These exercises cannot be made up!

Classroom Atmosphere: I am a pretty easy-going person and I really enjoy geology. I find it fun and exciting. I understand that you may not have my enthusiasm for the subject but I do expect that you be respectful of me and the other students in the class who are interested. Please do not read the newspaper or carry on private conversations while I am talking in class, it is distracting to me and probably to others around you. I encourage and enjoy lively discussions, laughter, and human foibles. If you see, hear or read of something related to earth science certainly feel free to bring it up in class. In addition, I want you to ask questions if you do not understand something. Please do not be offended if I table a question for a bit later in the lecture or class if we are about to get to that subject, I am just trying to use time wisely. Finally, I am highly tolerable of mistakes, primarily because I have a tendency to make them!! If something seems confusing, contradictory, or just plain wrong (including spelling) PLEASE bring it to my attention (I really mean this). I am human and boy do I have some flaws! I hope that this next fact does not come as a shock to you – so are you! Please don't be so hard on yourself! You'll make some mistakes, no big deal!

Grading Structure & Assessments: Read the following VERY CAREFULLY!!

≥ 360pts	**A**	**4 semester exams (33) }- 50 x 4 =**	**200**
320-359	**B**	**Class & Lab Activities –**	**100**
280-319	**C**	**(TMYN, in-lab, homework)**	
240-279	**D**	**Lab Quizzes -**	**60**
< 279	**F**	**Final Exam**	**60**
		Total Points for Course	**420**

Exams: The following apply to the exam portion of the course:

1. There will be **four (4) exams worth 50 points each** over the course of the semester (***TENTATIVELY SCHEDULED***: **Sept. 13th, Oct.11th, Nov. 8th, Dec. 1st**) and **a final exam worth 60 points**. **The exams will be a mixture of content knowledge, data analysis, concept application and geologic problem solving in a variety of formats and using various media, both in-class and/or online: multiple choice, short answer, diagrams, maps and essay questions.**

2. Though not common, there is a slight possibility that you may accumulate a total number of points at the end of the course that would give you a passing grade while having failed all of the lecture exams. In the unlikely event of this occurring I have a policy on -- **Passing exam scores: A passing semester exam score is 65% (33/50 points) or higher! You will NOT PASS the course if you do not pass at LEAST ONE of the four (4) semester exams! MEANING you must get 65% (33/50 points) or higher on at least one semester exam or you will fail the course no matter what how many total points you have at the end of the course. DO NOT Let this take you by surprise!!**

3. **There are no make-up exams!** I realize things come up and I will make a determination about these on a case by case basis, however, have no expectation that you will be accommodated!

Lab: Since this course fulfills a lab science requirement, **you must pass the lab portion of the course with at least a 65% (104/160 points) or you will not pass the course.** Coming to class is critical, and being present for the entire lab period is very important. **Your lab runs from 1-3:50. Do not schedule your work during our lab time, you need to be in class!** I realize things come up and I will make a determination about these on a case by case basis, however, have no expectation that you will be accommodated!

<u>VERY IMPORTANT</u> – you are in College!!

1. You are responsible for learning the ideas & skills associated with and ways of scientific thinking and reasoning, as well as the content knowledge and specific techniques that we use in class and lab. I am responsible for facilitating you in accomplishing this to the best of your ability by providing learning goals and objectives (see above and the additional topical guide), clear instructions and guidelines, examples, illustrations, explanations, case studies and relevant applications. **If I could "learn" you, I would, but I can't. Only you can learn and I can only facilitate that learning.**

2. You are responsible for understanding the contents and meaning of contents in this syllabus!

3. You are responsible for attending class or not so much. We go on without you!

4. You are responsible for checking D2L every day for updated NEWS items and added content and/or assignments

5. You are responsible for contacting me if you have questions, emergencies, need help or have any other concerns. Don't wait until it is too late to catch up!

6. You must check your metnet email or whatever email is listed with the college and in D2L. That email is how I will contact you. Not checking this email is no excuse for not knowing what is going on or what is assigned and when it is due!

7. I don't open emails that have no subject line or **that are from some address that seems weirdo to me**. So when you email me, at least put Geol Days or something in the subject line that will alert me that you are a student of mine.

8. If you don't use **the Learning Objectives and Notetaking Guide in class and/or when reading** and take advantage of being able to **watch online Earth Revealed Videos and complete associated videoguides**, you put your ability to succeed in this class at risk!! You must write, draw pictures, make charts, basically, work outside of class to learn the material. **The grade you earn is up to you, not to me!!**

How to use the Marshak Text Book

The text readings below are listed in the week during which we will work with the topic. I tried to be as specific as possible. **Important NOTE** – the figures associated with the readings listed below are probably more critical than the text itself!!! **Here is how to use the textbook -- Go through text sections below this way:**

1. Examine each figure.
2. **Read the figure caption** for each figure.
3. Find the portion of text in that section where the figure is described, explained, referred to, etc.
4. Go back to the figure and make sure that you can explain, interpret, draw, etc. each figure.
5. If needed, go back to the text and re-read it while examining the figure!!

Specific Marshak Textbook Readings*

NOTE: Exact timing (meaning week) is tentative! However, the order that we cover the reading material IS accurate.

Part I Week 1:	**Ch. 1** – pp. 14-15; sections 1.1, 1.2, 1.4, 1.6: *21-31*, 1.7, Box 1.2, Box 1.3
Parts I & II Week 2:	**Ch. 1** – pp. 14-15; sections 1.1, 1.2, 1.4, 1.6: *21-31*, 1.7, Box 1.2, Box 1.3 ***Ch*. 2** – sections 2.1, 2.2, 2.4, 2.5, 2.7, 2.8; Box 2.1
Week 3:	**Ch. 3** – sections 3.1-3.6, Box A.1, Figs. A.2, A.3, A.4, A.5 **Ch. 4** – sections 4.1- 4.10
Week 4:	**Ch. 4** – sections 4.1- 4.10
Week 5:	**Ch. 6** – sections 6.1, 6.3: *1st 4 paragraphs*, 6.4, 6.5, 6.7, 6.8, 6.9 **Ch. 9** – sections 9.1, 9.2: *up to p. 271*, fig. 9.4, 9.3 – 9.6
Part III Week 6:	**Ch. 6** – sections 6.1, 6.3: *1st 4 paragraphs*, 6.4, 6.5, 6.7, 6.8, 6.9 **Ch. 9** – sections 9.1, 9.2: *up to p. 271*, fig. 9.4, 9.3 – 9.6 **Ch. 10** – sections 10.1, 10.2: *thru p. 307, fig. 10.7 & pp. 310-311*, 10.3 – 10.5, *pp. 243 – long-term predictions*
Week 7:	**Ch. 9** – sections 9.1, 9.2: *up to p. 271*, fig. 9.4, 9.3 – 9.6 **Ch. 10** – sections 10.1, 10.2: *thru p. 307, fig. 10.7 & pp. 310-311*, 10.3 – 10.5, *pp. 243 – long-term predictions*
Part IV Week 8:	**Ch. 8** – sections 8.1., 8.2: *recrystallization, phase change, neocrystallization, plastic deformation*, 8.3: *pp. 231-233 (**no hydrothermal fluids**)*, 8.4: ***no hornfels, amphibolites***, 8.6: *contact, burial & regional metamorphosis only* **Ch. 5** – sections 5.1, 5.2, 5.4, Box 5.3, **Interludes B & C** **Ch. 7** – sections 7.1, 7.2: *joints, frost & root wedge, dissolution, hydrolysis, oxidation*, 7.4 – 7.6, 7.7: *evaporates/chert*
Week 9:	**Ch. 7** – sections 7.1, 7.2: *joints, frost & root wedge, dissolution, hydrolysis, oxidation*, 7.4 – 7.6, 7.7: *evaporates/chert* **Ch. 12** – sections 12.1, 12.3 – 12.6, 12.8, 12.10
Week 10:	**Ch. 12** – sections 12.1, 12.3 – 12.6, 12.8, 12.10
Week 11:	**Ch. 12** – sections 12.1, 12.3 – 12.6, 12.8, 12.10 **Ch. 11** – sections 11.1 – 11.5, Isostasy, 11.8 – 11.11
Week 12:	**Ch. 11** – sections 11.1 – 11.5, Isostasy, 11.8 – 11.11
Part VI Week 13:	**Interlude F** **Ch. 17** – sections 17.1 – 17.6, Box 17.1
Week 14:	**Ch. 19** – sections 19.1 – 19.4: ***up to Darcy's Law***, 19.5, 19.8
Week 15:	**Ch. 18** – sections 18.1, 18.6 – 18.8
Week 16:	**Ch. 18** – sections 18.1, 18.6 – 18.8 **Ch. 22** – sections 22.1, 22.2: *pp 758-762, pp. 765-770 advance retreat & sealevel change*, 22.3 -22.5, 22.7 – 22.8
Week 17:	**Ch. 22** – sections 22.1, 22.2: *pp 758-762, pp. 765-770 advance retreat & sealevel change*, 22.3 -22.5, 22.7 – 22.8
Week 18 :	**FINALS WEEK**

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I understand all of the above and recognize that my performance is this and any college course is determined by what I put into it.

Print Name_____

Signature_____ **Date**_____

I do *<u>NOT</u>* understand all of the above or recognize that my performance is this and any college course is determined by what I put into it. I would like to schedule a brief meeting with you to get clarification on what you mean by all of this.

Print Name_____

Signature_____ **Date**_____

Possible Meeting Times _____

Tentative **Lecture & Laboratory Schedule – Subject to Change as Needed by Instructor & Life.!#!?!**

We will follow this order of topics listed below, however, we may get ahead or behind from time to time!

Date	Course Section	Reading topics: See detailed reading list above	Lab Schedule
Week 1: **8/22**	Course Introduction; What is Science?	Data & Hypotheses; Process of Science; Earth Systems, Cycles; Bloom's taxonomy	Campus field trip; ***TMYN Graphing – plot points, read graph***
Week 2: **8/29**	**Parts I & II: ORGIN SOLAR SYSTEM & PLATE TECTONICS**	Origin of Solar System & Earth; Formation of Layered Earth; Geologic Data, Making Observations and Science	***TMYN Unit Conversions – all EXCEPT map scales*** Earth's Magnetic Field & Paleomag Lab
Week 3: **9/5**	**Part II: PLATE TECTONICS**	Geologic Data, Making Observations and Science Interior Structure of Earth; ***TMYN Density;*** Continental Drift & Seafloor Spreading;	**Lab Manual Ch. 1** Pre-lab: Ex. 1.1-1.4; Lab: 1.5-1.11;
Week 4: **9/12**	**Part II: PLATE TECTONICS**	Plate Tectonics, ***TMYN Rates***; Wilson Cycle **Exam 1** **(Student Success Day)**	**Lab Manual Ch. 2** Pre-lab: Ex. 1.1-1.3
Week 5: **9/19**	**Part II: PLATE TECTONICS**	Plate Tectonics, ***TMYN Rates***; Wilson Cycle;	**Lab Manual Chapter 16:** Pre-lab: 16.1 & Virtual Earthquake *(link in NEWS item)*
Week 6: **9/26**	**Part III: VOLCANISM, EARTHQUAKES AND IGNEOUS EARTH MATERIALS**	Intro to Volcanic Activity/Processes & Igneous Rocks & Intrusions; Earthquakes (mostly in lab) ***TMYN Unit Conversions – ONLY map scales*;**	***TMYN Slopes & Topo Maps*; Lab Manual Ch. 8:** Ex. 8.1-8.2; **Ch. 9**
Week 7: **10/3**	**Part III: VOLCANISM, EARTHQUAKES AND IGNEOUS EARTH MATERIALS**	Volcano and/or EQ case study; Volcanism & EQ (VEQ) Summary Assignment	***TMYN Slopes & Topo Maps*; Lab Manual Ch. 8:** Ex. 8.1-8.2; **Ch. 9**
Week 8: **10/10**	**Part IV: EARTH MATERIALS – METAMORPHIC AND SEDIMENTARY**	Metamorphism, Rock Cycle; Metamorphic and sedimentary Rocks; **(GSA)** **Exam 2**	**Lab Quiz # 1**: Lab Manual Ch. 1-2, 8-9, 16 (30 Pts); Classification Lab
Week 9: **10/17**	**Part V: GEOLOGIC TIME, STRUCTURAL GEOLOGY & GEOLOGIC MAPS**	Rocks Reveal Earth History; Geologic Time	Rock Identification; Mineral Descriptions, Patterns & Identifications
Week 10: 10/24	**Part V: GEOLOGIC TIME, STRUCTURAL GEOLOGY & GEOLOGIC MAPS**	Geologic Time, Mountain Building, Rock Deformation **(MEA)**	Rock Identification & Practice R/M Mix **Lab Manual Ch. 17**
Week 11: **10/31**	**Part V: GEOLOGIC TIME, STRUCTURAL GEOLOGY & GEOLOGIC MAPS**	Rock Deformation, Geologic Structures & Geologic Maps	**Lab Manual Ch. 15** Pre-lab: 15.1 Intro. To Geologic Maps
Week 12: 11/7	**Part VI: SURFICIAL GEOLOGY & PROCESSES**	***Review TMYN Rates***; Hydrologic Cycle & Rivers; **(Veterans Day)** **Exam 3**	**Lab Manual Ch. 10** Pre-lab: 10.1-10.3
Week 13: **11/14**	**Part VI: SURFICIAL GEOLOGY & PROCESSES**	Rivers; Mississippi River on Course; Groundwater & Karst **Last Opportunity to Drop Course**	***Review: TMYN Slopes & Topo Maps, Rates*** **Lab Manual Ch. 12**
Week 14: **11/21**	**Part VI: SURFICIAL GEOLOGY & PROCESSES**	Groundwater & Karst; EOA: Earth-Ocean-Atmosphere System Interactions **(Thanks giving)**	**Lab Quiz # 2:** Rock and Mineral Quiz Lab Manual Ch. 4-7 (30 pts)
Week 15: **11/28**	**Part VI: SURFICIAL GEOLOGY & PROCESSES**	EOA: Earth-Ocean-Atmosphere System Interactions **Exam 4**	***Review: TMYN Slopes & Topo Maps, Rates*** **Lab Manual Ch. 11 and/or 14**
Week 16: **12/5**	**Part VI: SURFICIAL GEOLOGY & PROCESSES**	EOA: Earth-Ocean-Atmosphere System Interactions	Climate Change
Week 17: **12/12**	**FINAL EXAM WEEK**	**Final Exam**	

Nov. 18th -- Last day to withdraw from course and receive a grade of "W"