

## ES202 Exam 1 Study Guide

(updated Winter 2024)

**Exam Logistics:** The midterm exam will occur on Wednesday Feb. 14, 2024, worth a total of 100 points, 1 point per question x 100 questions. We will start the exam during the class period at 2 PM, to provide ample time to answer questions. Exam questions will be comprised of multiple choice, true/false and short answer-fill in blank. Lab questions will involve images of samples and other activities we have engaged in the first half of the term.

### Recommended Study Techniques

- (1) review pre-lab questions and video review exercises: study the questions and answers
- (2) review the "How to Study" Physical Science Guide
- (3) use the key words / concepts as a checklist below as a guide to help you focus on the class notes
- (4) memorize terms and concepts
- (5) go over your on-line practice quiz questions / answers, make sure you know the answers
- (6) go back over the labs and make sure you can do the tricks / skills
- (7) review the important figures in your lab manual and text

**NOTE: I would spend a minimum of 5 hours studying for this exam if I wanted to do well.**

### Review Questions from Homework Assignments:

- Chapter 1 Introduction Reading Review Questions  
[https://people.wou.edu/~taylors/g202/Reading\\_Review\\_Questions\\_Chapter1\\_Introduction.docx](https://people.wou.edu/~taylors/g202/Reading_Review_Questions_Chapter1_Introduction.docx)
- Earth Revealed Down to Earth Video Review Questions  
[https://people.wou.edu/~taylors/g202/Video\\_Exercise\\_Earth\\_Revealed\\_Down\\_to\\_Earth.docx](https://people.wou.edu/~taylors/g202/Video_Exercise_Earth_Revealed_Down_to_Earth.docx)
- Earth Revealed Plate Dynamics Video Review Questions  
[https://people.wou.edu/~taylors/g202/plate\\_dynamics\\_review\\_questions.pdf](https://people.wou.edu/~taylors/g202/plate_dynamics_review_questions.pdf)
- Earth Revealed Minerals Video Review Questions  
[https://people.wou.edu/~taylors/g202/mineral\\_video\\_ex.pdf](https://people.wou.edu/~taylors/g202/mineral_video_ex.pdf)
- Intro to Rocks and Minerals Video Review Questions  
[https://people.wou.edu/~taylors/g202/video\\_exercise\\_rock\\_cycle.docx](https://people.wou.edu/~taylors/g202/video_exercise_rock_cycle.docx)
- Pre-Lab Concept Review Questions: Minerals-Rocks-Plate Tectonics  
[https://people.wou.edu/~taylors/g202/Pre-Lab2\\_tectonics-minerals-rocks.pdf](https://people.wou.edu/~taylors/g202/Pre-Lab2_tectonics-minerals-rocks.pdf)
- Earth Revealed Sedimentary Rock Video Review Questions  
[https://people.wou.edu/~taylors/g202/sed\\_videx.pdf](https://people.wou.edu/~taylors/g202/sed_videx.pdf)
- AGI Building the Planet Video Review Questions  
[https://people.wou.edu/~taylors/g202/Shaping\\_Planet\\_Earth\\_Questions\\_ver2.docx](https://people.wou.edu/~taylors/g202/Shaping_Planet_Earth_Questions_ver2.docx)
- Pre-Lab Review Questions: Sedimentary Rocks  
[https://people.wou.edu/~taylors/g202/Pre-Lab3\\_sedimentary\\_rocks.pdf](https://people.wou.edu/~taylors/g202/Pre-Lab3_sedimentary_rocks.pdf)
- Geologic Time Video Review Exercise  
[https://people.wou.edu/~taylors/g202/Earth\\_Revealed\\_Geologic\\_Time\\_Video\\_Exercise.docx](https://people.wou.edu/~taylors/g202/Earth_Revealed_Geologic_Time_Video_Exercise.docx)
- AGI Faces of Earth – Assembling America Video Review Exercise  
[https://people.wou.edu/~taylors/g202/AGI\\_Assembling\\_America\\_Questions.docx](https://people.wou.edu/~taylors/g202/AGI_Assembling_America_Questions.docx)
- Weathering and Mass Wasting Video Exercise  
[https://people.wou.edu/~taylors/g202/video\\_ex\\_masswaste.pdf](https://people.wou.edu/~taylors/g202/video_ex_masswaste.pdf)
- ~~Pre-Lab Key Word Review Topographic Maps~~  
~~[https://people.wou.edu/~taylors/g202/Pre-Lab5\\_topo\\_maps.pdf](https://people.wou.edu/~taylors/g202/Pre-Lab5_topo_maps.pdf)~~
- ~~Pre-Lab Video Review Exercise Topographic Maps~~  
~~[https://people.wou.edu/~taylors/g202/ES202\\_Topo\\_Map\\_Reading\\_Video\\_Questions\\_Youtube\\_ver2.docx](https://people.wou.edu/~taylors/g202/ES202_Topo_Map_Reading_Video_Questions_Youtube_ver2.docx)~~

## Canvas Online Practice Quizzes

- Task 2-1 Practice Quiz: Plate Tectonics, Minerals, Rocks
- Task 3-1 Practice Quiz: Sedimentary Rocks
- Task 5-1 Practice Quiz: Mass Wasting

## Lab Exercises

- Task 3-5 Physical Properties of Minerals
- Task 4-3 Sedimentary Rock Identification
- Task 4-4 Geologic Time / Stratigraphy
- ~~Task 5-5 Topographic Maps~~

## Part 1. Class Notes / Lecture Concepts

## Key Words

### ***Fundamentals/ Intro***

<http://www.wou.edu/las/physci/taylor/g202/202intro.pdf>  
[https://people.wou.edu/~taylors/g202/Intro\\_Earth\\_System\\_Sci\\_Method.pdf](https://people.wou.edu/~taylors/g202/Intro_Earth_System_Sci_Method.pdf)

Environmental Spheres  
Lithosphere  
Biosphere  
Hydrosphere  
Age of the Earth  
Ultimate Driving Forces  
Climate  
Gravity

Tectonics  
Crustal Composition  
Core  
Mantle  
Crust  
Oceanic Crust  
Continental Crust  
Asthenosphere  
Lithosphere  
"Plates"  
Scientific Method  
Hypothesis  
Experimental Design  
Unit Algebra

Unit Conversion  
Graphing  
~~Equation of Line~~  
~~Slope of Line~~  
 ~~$y = mx + B$~~   
~~map view~~  
~~cross-section view~~  
~~3-D view~~  
metric / English units  
mass  
temperature  
density

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### ***Mineral/Rock Overview***

<https://people.wou.edu/~taylors/g202/202rkmin.pdf>

rock  
mineral  
element  
compound  
atom  
nucleus  
electron  
proton  
neutron  
mineral properties  
crystal form  
luster  
color  
granite  
basalt  
~~obsidian~~

streak  
hardness  
cleavage  
fracture  
specific gravity  
rock forming minerals  
silicates  
carbonates  
oxides  
sulfates  
halides  
rock cycle  
igneous  
metamorphic  
sedimentary  
magma / lava  
sandstone  
shale  
limestone

fast-cooling lava  
slow-cooling magma  
two-phase cooling  
extrusive / lava  
intrusive / magma  
weathering  
sediment  
sediment transport  
sediment burial  
lithification  
fossil  
metamorphic  
foliation  
non-foliated  
heat-pressure-chemical  
  
siltstone  
~~gneiss~~  
~~slate~~

marble  
quartz

feldspar  
muscovite

biotite

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### ***Plate Tectonics Overview***

<https://people.wou.edu/~taylors/g202/202tect.pdf>

Continental Drift  
Plate Boundaries

Convergent  
Divergent  
Transform  
Spreading Center  
Subduction Zone  
Transform Fault

Volcanic Arc  
Mountain Building  
Mid-oceanic ridge  
Basaltic Oceanic Crust  
Granitic Continental Crust

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### ***Weathering /Sediment***

<https://people.wou.edu/~taylors/g202/202sedrk.pdf>

Weathering  
Erosion  
Sediment  
Agents of Transport  
    Wind  
    Water  
    Ice  
    Gravity  
Physical Weathering

rk fragmentation  
frost wedging  
unloading/release  
Thermal Expansion  
Root Wedging  
Animal Burrowing  
Chemical Weathering  
    carbon dioxide  
    carbonic acid  
    water  
Clay (size / mineral)  
bedrock

soil  
regolith  
colluvium  
alluvium  
drift  
lacustrine  
anthropogenic  
aeolian  
clay  
mass wasting

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### ***Sedimentary Rocks***

<https://people.wou.edu/~taylors/g202/202sedrk.pdf>

weathering  
sediment  
erosion  
lithification  
    compaction  
    cementation  
Sed. Rock types  
    Detrital  
    Biochemical

chemical  
sediment size fractions  
    gravel  
    sand  
    silt  
    clay  
grain shape  
grain sorting  
rock types  
    sandstone  
    conglomerate  
    shale  
    limestone

evaporites  
mudstone  
rock salt  
crystalline vs. microcrystalline  
coal  
clastic / nonclastic  
marine  
nonmarine  
fluvial  
lacustrine  
glacial

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## ***Stratigraphy/Geologic Time***

<https://people.wou.edu/~taylors/g202/timestrt.pdf>

Law of Original Horizontality	Half Life	Sill
Law of Superposition	Parent-Daughter Isotopes	Fault
Law of Uniformitarianism	Radioactive decay	Geologic time / Earth History
Law of Cross-Cutting Relations	Horizontal/vertical bed relations	Age of Earth
Relative Geologic Dating	Stratigraphy	
Absolute (numerical) Dating	Dike	

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## ***~~Intro to Topo Maps~~***

<https://people.wou.edu/~taylors/g202/topomaps.pdf>

<https://people.wou.edu/~taylors/g202/Week5-ES202-Lab-Topo-Maps.pptx>

<del>topographic maps</del>	<del>longitude / latitude</del>	<del>index contour</del>
<del>north arrow</del>	<del>UTM</del>	<del>law of V's streams</del>
<del>true north / magnetic north</del>	<del>Compass directions</del>	<del>hilltop contour patterns</del>
<del>map scale</del>	<del>Azimuth bearing</del>	<del>valley contour patterns</del>
<del>distance units (ft, m, km, mi)</del>	<del>Quadrant bearing</del>	<del>map view</del>
<del>angular measurement (degrees)</del>	<del>elevation</del>	<del>profile view</del>
<del>fractional scale</del>	<del>contour line</del>	
<del>graphical scale</del>	<del>contour interval</del>	

## Bigger Questions for Thought

How do the three ultimate driving forces relate to anything that we've covered since the beginning of the term?

What is the elemental composition of the Earth's crust? atmosphere?

What is the difference between a rock and mineral? Can you sketch the rock cycle yet?

What is the controlling factor of mineral properties? Why are they different?

What is the crust anyhow? Can you draw a diagram of the interior of the Earth (core, mantle, asthenosphere, crust)?

What factors influence how fast a rock will weather? Do all rocks weather at the same rate?

What is the difference between weathering and erosion?

What are the two meanings of the word "clay"?

What do rocks inherently decompose? Why are clay minerals stable at the Earth's surface?

What is the sedimentary process from start to finish?

How does transport energy relate to grain size of deposits? (e.g. would you find boulders in the deep ocean?)

What are the basic marine and nonmarine sedimentary environments?

What are sedimentary structures and how are they used to reconstruct sedimentary environments?

What type of environment do the various sed. rock types form? e.g. sandstone, conglomerate, evaporites, coal, mudcracks, limestone, etc. where would these rocks form at the earth's surface?

How do rocks physically and chemically weather? What are some of the specific processes?

How do sediments accumulate over time? How is time recorded in the rock record?

What are the primary types of mass wasting processes that deliver Earth Materials downslope under the influence of gravity? What are the primary factors that determine location and risk potential for mass wasting events and landslides in Oregon?

Given a geologic cross-section showing the rock record, can you apply the concepts of relative age dating (superposition, horizontality, cross-cutting relations [faults-dikes-unconformities] ) to determine the sequence of events that occurred geologically over time?

~~Can you read basic topographic map properties and determine scale, distance and elevation of points? What about identifying stream flow direction and location of hilltops and valleys?~~

## 2. Lab Skills to Work On

### Review Pre-Lab Questions and Key Words

Applying the scientific method

basic metric / english unit conversion

graphing

drawing sketch maps and cross-sections

Identifying basic mineral properties

which minerals / rocks fizz?

metallic vs. nonmetallic

light vs. dark colored

1 or 3 directions of cleavage

can you do a basic mineral hardness test?

Could you identify an igneous, sedimentary vs. metamorphic rock?

what about the three diff. types of sed. rocks?

Can you estimate: grainsize? sorting? grading? angularity?

Associating a specific rock type to a possible sedimentary environment?

How does transport energy relate to grain size of deposits? (e.g. would you find boulders in the deep ocean?)

What are the basic marine and nonmarine sedimentary environments?

~~What are sedimentary structures and how are they used to reconstruct sedimentary environments?~~

~~What type of environment do the various sed. rock types form? e.g. sandstone, conglomerate, evaporites, coal, mudcracks, limestone, etc. where would these rocks form at the earth's surface?~~