ES202 Exam 1 Study Guide
(updated Winter 2022)

Exam Logistics: The midterm exam will occur on Wednesday Feb. 9, 2022, worth a total of 100 points, 1 point per question x 100 questions. We will start the exam during the lab period at 1 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
- Earth Revealed Down to Earth Video Review Questions
  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
- Earth Revealed Minerals Video Review Questions
  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
- Pre-Lab Concept Review Questions: Minerals-Rocks-Plate Tectonics
  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
- AGI Building the Planet Video Review Questions
  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
- Geologic Time Video Review Exercise
  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
- Weathering and Mass Wasting Video Exercise
  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
- Pre-Lab Video Review Exercise – Topographic Maps
  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

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

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
~~obsidean~~
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

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

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

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

Stratigraphy/Geologic Time

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

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

Intro to Topo Maps

https://people.wou.edu/~taylors/g202/topomaps.pdf
https://people.wou.edu/~taylors/g202/Week5_ES202_Lab_Topo_Maps.pptx

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

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? atmopshere?

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?