

## ES202 Final Exam Study Guide (Winter 2013)

### The Exam Style

Multiple choice, true/false, completion, short list, short definition, lab-style problems, essay / sketching / drawing, map calculations / identification, identification of surface landforms from slides / overheads. The exam will focus on new material from mid-term, but with basic fundamental questions related to theme concepts covered early in the class.

### Recommended Study Techniques

- 1) go over pre-lab questions / study them
- 2) review the "How to Study" sheet handed out at beginning of term
- 3) use the concepts below as a guide to help you focus on your notes
- 4) memorize terms and concepts
- 5) go back over the labs and make sure you can do the tricks / skills
- 6) review some of the important figures in your lab manual and text
- 7) go to the lab and look at the lab answer keys, and study the physical models / displays.
- 8) review the techniques for working with maps / air photos
- 9) Go over the mid-term study guide (final will be in part comprehensive)
- 10) Go over and study the online homework questions
- 11) give your dog a bath
- 12) drink water

I WOULD SPEND A MINIMUM OF 12-14 HOURS STUDYING FOR THIS EXAM IF I WANTED TO DO WELL.

### Part 1. Lecture Concepts

#### Key Words

##### *Topo Map Review*

topographic maps  
north arrow  
magnetic declination  
map scale  
fractional scale  
graphical scale  
longitude latitude  
township-range-section  
equator  
prime meridian  
parallels  
angular measurement  
7.5 min quadrangle  
contour interval  
index contour  
law of V's / streams  
air photos  
stereovision

##### *Soil/Mass Wasting*

bedrock  
soil  
regolith  
colluvium  
alluvium  
drift  
lacustrine  
anthropogenic  
aeolian  
clay  
mass wasting  
slope gradient  
angle of repose  
creep  
slide  
flow  
debris flow  
mud flow  
landslide

debris slide  
solifluction  
slump  
rock fall

##### *Rivers*

Rivers / fluvial  
stream gradient  
channel  
floodplain  
oxbow lake  
meandering  
levees  
cutoff  
cutbank  
floodplain  
terrace  
stream gradient  
bedload

suspended load  
 dissolved load  
 braided  
 straight  
 normal discharge  
 flood discharge  
 capacity vs. competence  
 evaporation  
 advection  
 convection  
 infiltration  
 evapotranspiration  
 condensation  
 vegetative interception  
 runoff  
 soil moisture  
 ground water  
 surface water  
     rivers  
     lakes  
 oceans  
 atmospheric moisture  
 glaciers / ice budget  
 biologic water  
 water properties  
     heat capacity  
     molecule shape  
     heat capacity  
     density  
     capillarity  
     fluid / liquid  
     solid,liquid,gas

*Groundwater / Karst*

Groundwater  
 connate water  
 meteoric water  
 juvenile water  
 porosity  
 permeability  
 Porosity Types  
     intergranular porosity  
     Fracture porosity  
     solution porosity  
     vesicular porosity  
 Basics of Darcy's Law  
 permeable / impermeable  
 Zone of Aeration  
 Vadose Zone

dendritic  
 trellis  
 radial  
 alluvial fans  
 deltas  
 base level  
 watershed  
 Zone of Saturation  
 Capillary Zone  
 Water Table  
 Groundwater Contours  
 Water Table Gradient  
 Cone of Depression  
 Hydraulic Gradient  
 well  
 confined aquifer  
 unconfined aquifer  
 spring / seep  
 perched aquifer  
 aquitard / aquiclude  
 potentiometric surface  
 artesian aquifer  
 free-flowing artesian aquifer  
 groundwater contamination  
 upgradient / downgradient  
 groundwater subsidence  
 karst  
 dissolution  
 limestone  
 evaporites  
 solution depressions  
 caves / caverns  
 sink holes  
 sinking streams  
 karst springs  
 karst collapse  
 fracture-control of caverns  
 solution sinkholes  
 collapse sinkholes  
 karst lakes / sink hole lakes  
 swallow holes  
 caves  
 cave deposits  
 stalactites  
 stalagmites

*Glaciers*

glaciers  
 snowfields

drainage divide

*Hydrologic Cycle*

hydrologic cycle  
 precipitation  
 snow-firn-ice  
 global ice budget  
 alpine glaciers  
 continental glaciers  
 cirque glaciers  
 piedmont glaciers  
 ice sheets  
 ice shelf  
 temperate glacier  
 polar glacier  
 basal slip  
 internal ice flow  
 crevasse / fracture  
 transverse crevasse  
 longitudinal crevasse  
 glacial surging  
 snow line  
 zone of accumulation  
 zone of ablation  
 ice advance  
 ice retreat  
 static equilibrium  
 glacial erosion  
 plucking  
 abrasion  
 rock flour  
 glacial striations  
 u-shape valleys  
 v-shape valleys  
 hanging valleys  
 paternoster lakes  
 cirque  
 tarn  
 fjords  
 aretes  
 horn  
 col  
 roche moutenee  
 glacial pavement  
 drift  
 till  
 outwash  
 sorted / stratified

unsorted / unstratified  
moraine  
lateral moraine  
medial moraine  
end moraine  
terminal moraine  
Oxygen Isotope record  
Laurentide Ice Sheet  
Glacial / Pluvial Lakes  
Milankovitch Theory

### *Deserts*

arid climate  
desert  
semi-arid  
polar deserts  
sub-tropical deserts  
orographic / rain shadow effect  
Playa lakes  
salt flats  
pluvial lakes  
differential erosion  
butte  
mesa  
Inselbergs  
pediments  
badlands  
piedmont  
mountain front  
alluvial fan  
bajada  
bolson  
closed drainage  
arroyo  
aeolian  
deflation  
blow outs  
ventifacts  
desert pavement  
desert varnish  
sand dune  
erg  
dune morphology  
wind direction  
barchan dune  
parabolic dune  
transverse dune  
longitudinal dune  
loess

recessional moraine  
ground moraine  
glacial erratics  
outwash plain  
kettles  
drumlins  
desertification

### *Coasts*

Ocean  
Coast  
Marginal Marine  
salinity  
density  
ocean convection  
tidal bulge  
spring tide  
neap tides  
tidal range  
daily tidal cycle  
ocean currents  
waves  
storm surge  
hurricane  
orbital waves  
wave crest  
wave trough  
wave height  
tsunami  
wave length  
wave velocity  
wave base  
surf zone  
breaker  
swash  
longshore current  
rip currents  
beach  
foreshore  
wave-cut platform  
wave-cut terrace  
sand beach vs. rock coast  
longshore drift  
spit  
baymouth bar  
tombolo  
tidal island  
jetties  
groins

eskers  
kames  
glacial climate  
interglacial climate  
climate change  
Pleistocene glaciation  
breakwater  
erosional headlands  
sea cliffs  
sea stacks  
sea arches  
barrier islands  
back barrier lagoon  
tidal inlet  
delta  
submergent  
emergent  
fjords  
estuaries  
coastal uplift  
coastal subsidence  
sea level rise  
sea level fall  
reefs

## Questions for Thought

Do you know how to deal with maps?... profiles, map reading, directions, topography, contour lines, elevations?  
Can you calculate a stream gradient? I.D. a channel pattern and drainage pattern. What about simple unit conversions?

What's the difference between a floodplain and a terrace?

What are drainage divides and how are watersheds defined?

What are the hazards associated with mass wasting and rivers?

Can you draw, label, and discuss the hydrologic cycle in detail?

Can you draw cross-sections of groundwater systems?

Can you calculate the porosity of an earth material given the data?

How does sediment texture affect the porosity and permeability of an earth material?

Do you know the basic porosity types associated with common earth materials (limestone, sand, etc.)?

How does solution porosity form?

How is porosity and permeability developed in volcanic rocks?

What are the degrees of permeability associated with common earth materials (limestone, sand, etc.)

How are porosity and permeability related?

What is the hydraulic difference between an unconfined and confined aquifer?

What are the environmental hazards associated with groundwater?

Why are groundwater resources important?

How do caves form? What chemical processes / geologic processes are involved?

what types of climate and geologic conditions are associated with karst?

Can you write the chemical equations that result in the dissolution of limestone?

How are sink hole lakes related to the water table?

How do stalactites and stalagmites form?

How do glaciers and glacial ice form?

Why do glaciers flow?

How does the global ice budget relate to sea level / vice versa? How does it relate to climate?

What are the physical differences between a temperate and polar glacier?

What are the erosional and depositional effects of glaciation at the earth's surface?

How does a fluvial-dominated landscape compare to a glacial-dominated landscape?

What are the diagnostic landforms associated with alpine glaciers vs. continental glaciers?

How has glaciation affected North America over the past 2 million years?

How are glaciations related to sea level fluctuations?

What are the precipitation / vegetative characteristics of a "desert"? Are all deserts hot?

How are landforms in a desert different from humid climates and why?

How do ocean tides form?

What drives ocean circulation / currents?

How do waves form? What is their morphology and physics?

What coastal landforms are associated with emergent coasts? with submergent coasts?

What are the primary hazards associated with coastal areas... particularly coastal areas in western Oregon?

How do rocky shorelines erode / evolve over time?

What are the basic beach transportation processes?

## 2. Lab Skills to Work On

Locate positions on a map?

I.D. contour interval, hills, valleys, etc?

Calculate stream gradient?

recognize steep vs. gentle topography?

azimuth vs. quadrant compass bearings?

Location by township, range, section?

Identify basic river features: e.g. floodplain, channel, oxbow, terrace, braided river, meandering river

How about seeing airphotos in 3-D?

Drawing groundwater contour lines and groundwater flow paths.

Drawing contour lines in general (interpolating points of constant elevation).

Calculating gradients from maps.

Calculating groundwater gradients.

Measuring distances, directions, and scales on a topographic map.

Reading contour lines / elevations from a topographic map.

Determining gradients from a topographic map (slope gradients, stream gradients).

Calculating basic rates of process (change in process per unit time: e.g. rate of delta growth, rate of coastal erosion, rate of uplift, etc.)

Interpreting aerial photographs / seeing in stereoscopic vision.

Identifying actual landforms from slides / photos.

Identifying landforms and geomorphic processes on topographic maps (e.g. glacial forms, karst forms, river forms, desert forms, etc.).

Determining the direction of ice flow from drumlins, or from terminal / end moraine patterns.

Can you label and identify landforms from different climates on a block model?

Can you identify landforms from slides / photographs?