

## GEOG 1011 -- LANDSCAPES and WATER -- REVIEW for FINAL EXAM

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The final exam will consist of 80 multiple choice questions, followed by some fill-in-the-blank questions, some questions related to a map of the US, and 10 questions on slides. You will see some questions that you have seen before, perhaps worded a little differently. Most of the information will come out of lecture notes; use the book as a backup. You need to know some terms (see below) but not as many as are given in the book. I will post copies of the previous exams on a glass-encased bulletin board located down the east hallway on the first floor of Guggenheim (not the basement). The following summarizes the main topics covered in this course:

### I. Basic Geology (lecture notes from Aug. 25 - Sept. 15; book chapt. 11 & 12)

Review large-scale geologic processes that create major topographic features on the earth's surface:

- basic earth structure (differences in layers; density and composition of crust and mantle)
- rock types, including table 11-2 showing classification & characteristics of igneous rocks
- plate tectonics: evidence used in developing the theory; 3 types of plate boundaries (p. 373)
- earthquakes: review class notes, including points about New Madrid Seismic zone
- volcanism: review class notes, see pp. 383-394

**key words:** lithosphere, asthenosphere, mantle, crust, isostasy, magnetic reversal, elastic rebound, lahar, pyroclastic flow, composite volcano, shield volcano, caldera

### II. Weathering, Mass Wasting and Soils (lecture notes from Sept. 17 - Oct. 13; Chapt. 13 & 18)

A. Weathering: Remember that rocks form at high temperature and high pressure so they are out of equilibrium with the earth's surface environment; mineralogy and texture determine resistance to physical and chemical weathering. Review processes involved in

- mechanical weathering (small pieces -> big pieces; temp. & pressure effects)
- chemical weathering: review relation to igneous rock types (texture and mineralogy)

**key words:** hydrolysis, oxidation, carbonation

B. Soils (= products of weathering; Chapt. 18)

- soil properties (review material on pp. 560-564)
- importance of climate, soil water and soil chemistry (especially pH)
- soil forming factors (C.I.O.R.P.T.)
- know basic characteristics of 4 soil orders: spodosols, oxisols, mollisols, aridisols (for example, you should be able to complete a table with blanks for various soil properties)

**key words:** eluviation, illuviation, pH, cation exchange, podzolization, calcification, salinization, diagnostic horizon

C. Mass Wasting (lecture notes on landslides, debris flows; Chapt. 13)

### III. Hydrology and Rivers (lecture notes from Oct. 17 - Nov. 21; Chapt. 9 & 14)

A. Hydrology

- hydrologic cycle: review water balance eqn., and the meaning of different terms (see below); review soil moisture states, and processes of infiltration and runoff.
- groundwater (hydraulic gradient, permeability)
- surface water and floods

**key words:** water balance, actual evaporation, potential evaporation, soil moisture deficit, surplus, overland flow, field capacity, capillary water, hygroscopic water, wilting point, confined aquifer, unconfined aquifer, permeability, porosity, hydraulic gradient, drawdown, recharge, overdraft

## B. Fluvial Processes

- flow in channels (velocity, slope, depth)
- sediment erosion, transport, and deposition
- relation between sediment load and channel pattern (meandering vs. braided rivers)
- concept of equilibrium & the longitudinal profile (slope)
- effects of changes in hydrology and sediment load on rivers

**key words:** grain size, drag and lift forces, bed load, suspended load, alluvium, meandering rivers, braided rivers, exotic river, longitudinal profile

## V. Glaciation and Climate Change (lecture notes from Nov. 24 - Dec. 8; Chapt. 17)

- formation and movement of glacial ice; differences between temperate and polar glaciers
- mass balance, accumulation vs. ablation; effects of climate change on mass balance
- properties of ice and flow characteristics; erosion & deposition by glaciers
- outburst floods
- causes and consequences of climate change over the last several million years & connections to the formation of major mountain ranges, e.g. Himalayas

**key words:** firn, cold-based and warm based glaciers, accumulation, ablation, equilibrium line altitude (ELA), regelation, crevasse, surge, abrasion, plucking, cirque, hanging valley, U-shaped valley, roche moutonnée, moraine, esker, drumlin, coulee

Don't forget to read the paper ("Roof of the World") placed on reserve in the Benson Earth Science library. I will not ask questions about the other papers that you read earlier in the semester.