

## **ESC 1000: Introduction to Earth Science**

### **Study Guide for Lectures 28-31**

Note: this study guide lists topics covered in lectures 28-31 (Nov 8-19). It is not intended to replace going to lecture or doing the readings, rather, it serves largely to alert you to the important topics covered in these lectures that will likely be covered on the exams. The topics listed are non-exclusive, that is, there will be other material in the lectures that you are likely responsible for learning. Make special note of the vocabulary lists...there is a lot of terminology in this class that you will need to learn. Your textbook has a glossary that should be helpful.

#### ***Lecture 28 (Energy Resources; Nov 8):***

What determines what types of energy resources are used for a given application?  
What are the largest sources of energy in the U.S. (and Florida)?  
How are the major fossil fuel types formed, what geographic areas have significant reserves of them, and what are the pluses and minuses of their use?  
What are the main elements of petroleum systems?  
What are the alternatives to fossil fuels, and what are the pros and cons of using them?  
What is the most abundant energy resource on Earth?

Vocabulary: energy, fossil fuel, coal, petroleum, migration, trap, reservoir rock, source rock, overburden, petroleum system, nuclear energy, hydrogen power, tidal power, wave power, geothermal power,

#### ***Lecture 29 (Forensic Geology; Nov 15):***

What were the main events and who were the main players in the development of forensic geology?  
What is the transfer principle?  
What types of materials are studied by forensic geologists, and what features do they look at?  
What geologic principles are applied in forensic geology?  
Know the salient features of the case studies mentioned in class.

Vocabulary: forensics, forensic geology, provenance, superposition, Materials Analysis Unit, transfer principle

#### ***Lecture 30 (Hydrologic Cycle; Nov 17):***

What drives the hydrologic cycle?  
What are the properties of water that make it so important?  
Where did Earth's water come from?  
What are the reservoirs (sinks) in the hydrologic cycle, and what are the transport and transformation processes that move water between them?  
What are the largest reservoirs in the hydrologic cycle?  
What is residence time, and how does it vary between reservoirs in the hydrologic cycle?

What is the difference between fresh water and salt water, and why is ocean water salty?

Vocabulary: polar, solvent, heat capacity, glacier, soil moisture, condensation, sublimation, evaporation, freezing, melting, transpiration, residence time, evapotranspiration, fresh water, saltwater

***Lecture 31 (Groundwater; Nov 19):***

What is groundwater, why is it important, and where is it found?

What controls the location of the water table?

What is the difference between a gaining and a losing stream?

Why do springs occur, and what causes some springs to be artesian?

What controls the porosity and permeability of a rock/sediment, and how are these related to aquifers and aquitards?

What controls the rate of movement of groundwater?

What are the problems associated with groundwater withdrawal from wells?

Vocabulary: groundwater, zone of aeration, zone of saturation, water table, belt of soil moisture, capillary fringe, springs, gaining streams, losing streams, artesian springs, porosity, permeability, aquifer, aquitard, perched water table, cone of depression, recharge, drawdown, recharge, subsidence, saltwater intrusion