

**ESR 320**  
**ENVIRONMENTAL SYSTEMS I**  
**THINGS TO KNOW FOR THE SECOND MIDTERM**

As before, OPEN NOTES/READINGS. Don't memorize details but know exactly where to find them.

Simple Calculations you should be ready for:

Be able to calculate the velocity and flow of a river using the Manning's Equation and some given data.

Given some facts about precipitation, runoff, evaporation, etc. be able to figure out missing pieces of the hydrologic cycle by mass balance considerations. I.e., given enough information about other flows, be able to calculate something like infiltration to groundwater or change of storage in a lake.

Likewise, if I give you a set of conditions about a heat balance, be able to compute a the missing term from a heat-balance set up.

Be able to do basic calculations with radiative and evaporative heat transfer equations. For example, if you know the temperature of an object, you should be able to calculate its radiative output via the Stefan-Boltzmann Law. Conversely, if you are given the radiative heat flux from an object, be able to calculate the temperature.

If you are given an evaporation rate, you should be able to calculate the associated heat flux. (Multiply the mass loss via evaporation times the latent heat of vaporization.)

Other (non-calculation) things to know:

Know the general patterns moisture distribution in soil over the course of the year.

Know the factors that influence solar angle. These include both the "astronomical" factors of declination, latitude and hour angle, but also the factors contributed by topography and local terrain.

Know or be able to quickly access the vocabulary associated with everything we have been covering since the last midterm. E.g., know or find definitions of terms such as interception, capillary fringe, longwave radiation, shortwave radiation, etc.