STUDY TOPICS FOR HYDROLOGY MIDTERM
Water stores and pathways on Earth, range of space and time scales, basic physical quantities and laws, basic properties of water
Major water types: Atmospheric water, surface water, groundwater, soil water
Where most of the world’s water is bound up
The Hydrological Cycle and its “issues”
The concept of the Water Balance (or water budget), usage of water budgets via measurement and modeling
The Importance of Hydrology to Society

Global Hydrology and the atmosphere
Laws of radiant energy exchange
Atmospheric structure and dynamics
Environmental lapse rate
Global energy budget
Latitudinal energy transfers
General circulation, teleconnections
Types of precipitation: convective, orographic, cyclonic, frontal
Pressure gradient force, Coriolis effect, friction, pressure and wind belts
Global hydrologic cycle

Artificial precipitation/cloud seeding
Measuring precipitation: precipitation type, depth, intensity, duration, return period/recurrence interval
Calculating frequency of events or the return period/recurrence interval
Non-recording vs. recording gages
Point measurements, sampling issues, effects of surroundings
Areal precipitation, arithmetic mean, Theissen polygons, isohyetal method
Doppler radar as an alternative; calibration/validation

Molecular nature of Evaporation, latent heat of vaporization and condensation
Importance of condensation nuclei
Collision coalescence vs. Bergeron effect
Dew point temperature, relative humidity, elevation that clouds form, the “mountain problem”
Actual evapotranspiration vs. potential evapotranspiration
Dry adiabatic lapse rate vs. saturated (or wet/moist) adiabatic lapse rate
Drivers of evaporation rates
The mechanism of transpiration
Measurement of evaporation and evapotranspiration, pan evaporation vs. lake evaporation, lysimeters, water budget approach
Spatial variation in evaporation rates
Wilting point and Field capacity
Estimating evaporation rates through equations based on other variables: Thornthwaite, Blaney-Criddle, Penman-Monteith
Vapor pressure vs. saturation vapor pressure, relationship of saturation vapor pressure with temperature, relationship between evaporation/condensation/vapor pressure vs. saturation vapor pressure
Condensation and the concept of “saturation” (what is actually happening at the molecular level)