

**EAAE E6240: Physical Hydrology**

**Lecturer:** Professor Gavin Gong, Department of Earth and Environmental Engineering

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Appointment, Drop-in

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**Lectures:** Tue & Thu 2:40 – 3:55 pm, in 327 Mudd

**Prerequisites:** CIEE E3250 or equivalent, or instructor permission

**Grades:** 3 Assignments (60%); White Paper (20%) + Presentation (10%) + Review (10%)

**References:** *Incomplete course handouts*

Physics of Climate, by Peixoto and Oort; American Institute of Physics, 1992.

Global Physical Climatology, by Hartmann; Academic Press, 1994.

A Short Course in Cloud Physics, by Rogers and Yau; Pergamon Press, 1989.

Hydrology, An Introduction, by Brutsaert; Cambridge University Press, 2005.

Physical Hydrology, by Dingman; Prentice Hall; 2002.

Meteorology Today, by Ahrens; Brooks-Cole, 2002.

Elements of Physical Hydrology, by Hornberger et al.; Johns Hopkins, 1998.

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**Tentative list of topics:** See Courseworks (Lectures) for specific readings

- 1) Global Energy Balance: Conservation of energy; radiation components and balance; energy transport; atmospheric circulation
- 2) Atmospheric Hydrology: Atmospheric water vapor fluxes; global moisture transport; regional climates; cyclogenesis
- 3) Condensation: Atmospheric thermodynamics, saturation, and stability; nucleation and diffusional growth
- 4) Precipitation: Collision and coalescence; drop size distribution; rainfall rate; interception
- 5) Snow Hydrology: Snowpack properties, evolution and energy fluxes
- 6) Landsurface Hydrology: Surface runoff; kinematic wave; streamflow generation; TOPMODEL; streamflow routing; abrupt waves