

Geography 549, Spring, 2017

WATER & WATERSHEDS, WEEKLY SCHEDULE

Instructor: Dr. Allan James Email:AJames@sc.edu
Class meetings: Tu-Th 1:15-2:30, Rm 102 Callcott Bldg.

| <u>[Week]</u> | <u>Topic</u> | <u>Text Readings</u> |
|---|---|--|
| [1] Tu 1/10 | Introduction: Course mechanics; “ <i>Watersheds: What are they and why study them?</i> ” | Ch.1 |
| <i>I. Physical Hydrology</i> | | |
| Th 1/12 | Runoff generation processes. Surface water budgets; units; water storage on hillslopes. | <u>Water Budget & Units Exercises</u> ; Ch.5 |
| [2] Tu 1/17 | Infiltration, Percolation & Soil water. Runoff generation and pathways; Variable source area concept. | Ch.5 |
| Th 1/19 | Urbanization & impermeable surfaces; Detecting hydrologic change: Flow duration curves; Double-mass curves | Ch.5 |
| <i>II. Spatial Analysis of Drainage basins</i> | | |
| [3] Tu 1/24 | General principles of spatial analysis in watershed science; Hydrologic unit codes (HUCs); manual divide mapping. | <u>Manual Delineation Exercise</u> ; Ch.5 |
| Th 1/26 | Computer lab: General GIS Analysis of Rocky Branch Watershed. | <u>General GIS Exercise</u> |
| [4] Tu 1/31 | Geomorphometry: DEMs; LiDAR data and maps. Mapping divides automatically; Exploring LiDAR DEMs for hydrogeomorphic info. Headwater stream mapping. | _____ |
| Th Feb.2 | Computer lab: Automated drainage basin delineation. | <u>Automated Delineation Exercise</u> |
| [5] Tu 2/7 | Collecting imagery with UAV; Structure-from-Motion (SfM) photogrammetry. | _____ |
| Th 2/9 | Rainfall-Runoff models: Types & concepts; SCS curve number method. | _____ |
| [6] Tu 2/14 | Concentrated Flows in Channels: discharge; hydrographs. | Ch.6 |
| Th 2/16 | Streamflow measurement and gauges. | <u>IHA Exercise</u> ; handouts; Ch.6 |
| [7] Tu 2/21 | *** Midterm Exam *** | _____ |
| <i>III. Water Quality and Non-Point Source Pollution</i> | | |
| Th 2/23 | Principles of Water Quality: concentrations; water chemistry; dissolved and suspended solids (TDS & TSS); DO, nutrients. | <u>WQ Exercise</u> ; Ch.9 |
| [8] Tu 2/8 | Soil erosion; History: Cotton* era in the SE; Myths: pristine pre-Columbian landscapes & post-colonial devastation. <i>Grad. Student term paper proposals due in class.</i> | Ch.10 |
| Th Mar.2 | Estimating soil erosion | Ch.10 |
| [9] Tu/Th 7&9 | --- Spring Break (no classes) --- | _____ |

WATER & WATERSHEDS
Tentative Weekly Schedule Outline (Continued)

Chapter &
[Week] Date Topic Text Pages

[10] Tu 3/14 Sediment in surface-water systems; Calculating sediment loads: Ch.10
Sediment rating curves; Hysteresis.

Th 3/16 Sediment at the broad scale: budgets, waves, global yields; Sediment delivery ratios Ch.10
and implications to legacy sediment.

[11] Tu 3/21 Lab methods: measuring sediment texture & suspended sediment concentration Ch.10

IV. Flood-Risk Assessment

Th 3/23 Computing risk of extreme events; principles of probability. Ch.14 excerpts; Ch.15

[12] Tu 3/28 Floodplain Vulnerability, Floodplain Mapping, & Flood Hazard Mgt Ch.16 excerpts

V. Water Rights Law

Th 3/30 Water rights law: common and statutory basis of governing water allocations Ch.20

[13] Tu Apr.4 Riparian, regulated riparian, prior appropriation, and modified appropriation Ch.20
State water rights law

Th 4/6 Guest lecture (TBA). _____

[14] Tu 4/11 Clean Water Act: basic structure and foundational sections _____

Th 4/13 Course wrap up. _____

Term papers due (graduate students only).

[15] Tu 4/18 Presentations and discussions of graduate student papers _____

Th 4/20 Presentations and discussions of graduate student papers _____

Final Exam - Thursday, May 2, 4:00 pm, Rm 102, Callcott Building