Bio 5615/ ENVS 4615/ENVS 2390: Introduction to Freshwater Ecology
MW 3:30– 5 pm
LLAB 109

Dr. Melinda Daniels
Cell: 860-617-3652
(mdaniels@stroudcenter.org)

Students will develop an understanding of freshwater ecosystems, including stream channel and watershed physical and chemical characteristics, the ecology of bacteria, algae, insects and fish, and the impacts of human activities on freshwater ecology and water resources. The material is presented from a watershed perspective and focuses on streams and rivers. However, wetland and lake ecology is introduced. The course begins with considering the physical and chemical characteristics of streams and their watersheds (hydrology, geomorphology, and chemistry), then introduces the major ecosystem processes (e.g. nutrient cycling) and finishes with groups of freshwater organisms. Although the focus throughout is on biological ecosystem structure and function, significant attention is dedicated to human interactions with and management of freshwater systems. Grading is based on three exams and one paper assignment.

Topics Covered

- Streams: watershed, hydrology, and physical characteristics
- Water chemistry: carbon, nitrogen and phosphorus cycles, pollutants, aqueous geochemistry
- Biota: bacteria and other microbes, algae, invertebrates, and fish
- Lake and wetland ecology
- Processes in aquatic ecosystems: nutrient spiraling and the River Continuum Concept, primary and secondary productivity, top-down and bottom-up controls
- Energy flow
- Human impacts
- Natural and human chemical signatures
- Water quality assessment
- Watershed and land use planning: storm water management, land use, other best management practices, and stream restoration

Course Professor(s): Dr. Melinda Daniels serves as the lead instructor/course coordinator. Additional instructors are fellow PhD freshwater scientists at Stroud Water Research Center in Avondale, PA (www.stroudcenter.org) and will lead course modules in their areas of expertise (see course schedule).

Course Structure: The course is taught as three distinct modules focusing on 1) physical structure and function, 2) ecosystems processes, and 3) organismal biology of freshwater ecosystems.

Textbook: *Freshwater Ecology: Concepts and Environmental Applications of Limnology,* Dodds and Whiles
Paperback ISBN: 9780128132555
eBook ISBN: 9780128132562

Grading: 3 exams, 1 research review paper, equally weighted (25% each). Occasionally, additional homework exercises may be assigned for ungraded or extra-credit work. Make-up exams will only be granted with written documentation of an excused absence. Late assignments will be assessed 10% per day late.