

Subject: River Ecohydraulics

Course number : DMP3870E

Instructor : Assoc. Prof. Kelly Kibler

Term / Time : Winter through Spring

1 Course Description

Modification of natural rivers is often necessary to protect against losses of human lives and property related to water and sediment-related hazards. However, without careful planning, river modification may lead to ecosystem degradation. To support sustainable and multi-objective management of rivers and aquatic resources, this course investigates fundamental linkages between physical processes, management actions, and ecological responses. Students will explore processes relevant to low- and high-gradient river systems, gaining knowledge at the intersection of fluvial geomorphology, river engineering, and stream ecology theory.

2 Course Outline (Course Topics)

Week

- 1 : Dynamic equilibrium of rivers and effective discharges for geomorphic work
- 2 : Physical aquatic habitat of lotic ecosystems
- 3 : Specialized use of physical/hydraulic habitats by aquatic organisms
- 4 : Natural flow regimes and indicators of hydrologic alteration
- 5 : Hydrogeomorphic effects: interaction of flow and sediment
- 6 : Ecohydrology: riparian and hyporheic environments
- 7 : Environmental Impacts of Dams (Dr. Iwami, MLIT)
- 8 : Environmental Impacts of Dams (Professor Sumi, Kyoto University)
- 9 : Sediment Management in Reservoirs (Professor Sumi, Kyoto University)
- 1 0 : Sediment Management in Reservoirs (Professor Sumi, Kyoto University)
- 1 1 : Aquatic-terrestrial ecosystem linkages**
- 1 2 : Bank erosion and river engineering
- 1 3 : Ecosystem services and river restoration
- 1 4 : Hydraulics of fish passage structures
- 1 5 : Exam

** Supplement activity to Lecture 11: Extra credit viewing of film *Riverwebs* in evening, outside of class time.

3 Grading

60% Assignments and short quizzes

40% Exam

4 Textbooks

4-1 Required

4-2 Other- Primary academic literature, provided by the instructor