RNEW 5990 (2): Spatial Hydrology
Syllabus, Spring 2010

Lecture: TBD in discussion with class
3 of 4 Credits

Instructor: Dr. Scott Miller, Department of Renewable Resources
314 Agriculture Building C
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Office Hours: Tuesday 11-12; Wednesday 11-12; or by appointment

Readings: Textbook: None

Supplemental Reading: Will be available through course web site.

Description: The scope of this class will be aimed at the practical use of established and emergent spatially explicit techniques for hydrologic investigations. We will investigate how these tools are best applied and understand their strengths and limitations through highly linked lectures and labs. Critical processes that drive the water cycle will be examined, including evapotranspiration, runoff, soil moisture, snowpack/glacial processes, and rainfall. Spatially explicit hydrologic modeling techniques, including the use of GIS-based tools and remote sensing technologies will be examined in theory and application. Note that the final course schedule and areas of focus content will be dependent on the interests of the students.

Objective: The goal of the class is to familiarize students with advanced explicitly spatial modeling techniques for hydrology.

Grading:

Lab/Homework Assignments	160 points
Attendance and participation	50
Class project	50 (if student is opting for 4 credits)
Total available points (graduate):	**210 or 260**

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Grading Policy: Late work will be deducted 10% per class period past the due date. Work will not be accepted 2 weeks past due date.

Course Organization and Assignments

The course is divided into units that focus around a particular modeling exercise. The lectures and labs will be focused on understanding and solving that unit's exercise. A class project is required of all graduate students. This project is intended to support your ongoing thesis work, if applicable, and in the past has led to several presentations and publications.

Expected Course Schedule

First Section: Watershed Modeling

Unit 1. Watershed modeling in GIS Part 1: large scale simulations
- Introduction to the Automated Geospatial Watershed Assessment Tool (AGWA)
- Soil and Water Assessment Tool (SWAT)

Unit 2. Watershed modeling in GIS Part 2: physically based modeling
- Kinematic Runoff and Erosion Model (KINEROS2)

Unit 3. HEC Tools Part 1: watershed simulations
- HEC-HMS

Second Section: Channel Modeling; Hydraulics and Morphology

Unit 4. HEC Tools Part 2: hydraulics and channels
- HEC-GeoRAS

Unit 5. High resolution modeling – terrain and channel assessments
- LiDAR, RADAR

Third Section: Erosion Modeling

Unit 6. Erosion modeling at the hillslope scale
- The Runoff Hillslope and Erosion Model (RHEM)

Unit 7. Explicit routing and erosion
- Water Erosion Prediction Project (WEPP)

Fourth Section: Integrated Modeling

Unit 8: Water Quality
- River and Stream Water Quality Model (QUAL2K)

Unit 9. Integrated surface and subsurface modeling
- The Gridded Surface Subsurface Hydrologic Analysis model (GSSHA)

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation of your disability to, University Disability Support Services (UDSS) in SEO, room 330 Knight Hall, 766-6189, TTY: 766-3073

Student Code of Conduct

1. Students should exhibit respectful classroom values and behavior by:
   - engaging in appropriate communication, interaction and preparedness
   - demonstrating trust, respect and civility
   - approaching course content as important and necessary
   - meeting all deadlines for assignments and team member obligations
   - turning off cell phones in class
   - avoiding unnecessary talking
   - not reading outside material or doing other work during class

2. Students should contribute to a positive learning environment by:
   - arriving, attending and departing class in a respectful manner
   - taking responsibility for team and individual assignments
   - developing cooperative relationships with other students and faculty

3. Students should support a professional learning environment by:
   - avoiding inappropriate language
   - refraining from unrealistic expectations in dealing with administration, faculty and staff
   - communicating with the instructor if changes could be made to improve the learning environment

4. Students must uphold the academic integrity standards expected by the University of Wyoming. Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. Each team member must carefully collaborate and have jointly participated in the final output. The University of Wyoming's definition of Academic Dishonesty referenced in the Student Code of Conduct: "An act attempted or performed which misrepresents one's involvement in an academic task in any way, or permits another student to misrepresent the latter's involvement in an academic task by assisting the misrepresentation." These acts include, but are not limited to: "Representing as one's own work material copied or borrowed from any source, written or otherwise, public or private, without proper citation of the source. *See* University of Wyoming Regulation 802. A good rule of thumb is to never use more than five consecutive words from a source without providing a citation. Student work may be evaluated for plagiarism using anti-plagiarism software if the instructor suspects academic dishonesty.