

COURSE INFORMATION

Spring 2009

Course: Environmental Science 4320 - Hydrologic and Water Quality Modeling
Natural Resources 4320/7320 - Hydrologic and Water Quality Modeling
Biological Engineering 4350/7350 - Watershed Modeling Using GIS
Civil Engineering 4720/7720 - Watershed Modeling Using GIS

Prerequisites: NATR 1090 or equivalent and an introductory soils or hydrology course; or instructor's consent.

Instructors:

Dr. Steve Anderson
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Dr. Allen Thompson
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Office Hours: 2:00 - 4:00 p.m. Monday (please call to make sure the instructor is in before coming); please call to make an appointment if you would like to schedule a different time.

Purpose of Course: The overall goal of this class is to provide students with the necessary tools to use models, appreciate their purpose and limitations, interpret results, and perform sensitivity analyses. To achieve this goal, this course aims at reaching several objectives, including:

1. Familiarize students with basic hydrology, erosion, and chemical transport principles modeled in deterministic hydrological models of surface and ground water.
2. Give students an understanding of the tools available to estimate input parameters, and to calibrate and validate models.
3. Give students an understanding of the uncertainty analysis process.
4. Illustrate the role and limitations of models in solving current environmental problems.

Texts: Notes from the SWAT user manuals.

Reference Material: Located at Reserve Desk, Ellis Library.

Room & Time: Lectures/Labs in 109 ABNR Bldg., Tues. & Thurs. at 12:40-2:30 p.m.

Assignments: These are due at the end of the lecture or laboratory session. A point penalty will be applied for assignments turned in late: 10% of the maximum number of points per working day with a maximum total reduction of 50%. No homework or laboratory assignments will be accepted after Reading Day, May 8.

Attendance: Student attendance is mandatory since this is a computer laboratory

course. Learning to use models is done during class time as part of the computer laboratory sessions. An absence will be considered as unexcused if prior permission has not been granted by the instructor. Each unexcused absence will result in a loss of 3% of the total possible points for the course. Students arriving past 12:50 p.m. (ten minutes after the beginning of the lecture) will be counted as an unexcused absence.

Course Grade:

Homework	20%
Laboratory Reports	30%
Mid-Term Examination	25%
Final Examination	<u>25%</u>
	100%

Minimum grade with a percentage of:

100 to 98 A+	97 to 93 A	92 to 90 A-
89 to 88 B+	87 to 83 B	82 to 80 B-
79 to 78 C+	77 to 73 C	72 to 70 C-
69 to 68 D+	67 to 63 D	62 to 60 D-
<59 F		

The range of scores to obtain a given grade may be revised downward but not upward.

Graduate Credit: Students who are registered in the 7000-level course will obtain graduate credit. Separate exams will be given to 4000-level and 7000-level students. Graduate students will be expected to perform more integrative questions.

University of Missouri-Columbia Notice of Nondiscrimination:

The University of Missouri-Columbia does not discriminate on the basis of race, color, religion, national origin, ancestry, sex, sexual orientation, age, disability, or veteran status. For more information, please visit <http://www.missouri.edu/eeo-aa.htm>.

Access to Instructional Materials (ADA requirements):

If you need accommodations because of a disability, if you have emergency medical information to share with the instructor, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Please see the instructor privately after class, or at the office.

To request academic accommodations (for example, a notetaker), students must also register with the Office of Disability Services, (<http://disabilityservices.missouri.edu>), S5 Memorial Union, 882-4696. It is the campus office responsible for reviewing documentation provided by students requesting academic accommodations, and for accommodations planning in cooperation with students and instructors, as needed and consistent with course requirements. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.

Academic Honesty Statement:

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all

students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.

Intellectual Pluralism

The University community welcomes intellectual diversity and respects student rights. Students who have questions concerning the quality of instruction in this class may address concerns to either the Departmental Chair or Divisional leader or the Director of the Office of Students Rights and Responsibilities (<http://osrr.missouri.edu/>). All students will have the opportunity to submit an anonymous evaluation of the instructors at the end of the course.

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COURSE SYLLABUS
Spring 2009

DATE	LECTURE TOPIC	LAB	ASSIGNMENT DUE	READINGS IN MANUALS
Jan. 20	Course Introduction: Hydrology and Modeling, SWAT			pp 1-27
Jan. 22	ArcSWAT (1 st Demo) Documentation	ArcSWAT		ArcSWAT
Jan. 27	Laboratory Session	Excel Review		
Jan. 29	ArcSWAT (2nd Demo)	ArcSWAT		
Feb. 3	Surface Runoff Calculations			pp 97-121
Feb. 5	Laboratory Session	Lab 1		
Feb. 10	Soil Water & Groundwater Transport			pp 145-179
Feb. 12	Flow Routing/Laboratory Session	Lab 1	Hmwk #1	pp. 379-395
Feb. 17	Flow Measurements, Averages, and Baseflow			pp 167-179
Feb. 19	Laboratory Session	Lab 1		
Feb. 24	Erosion Processes		Lab #1	pp 232-249
Feb. 26	Laboratory Session	Lab 2		
March 3	Sensitivity Analysis		Hmwk #2	Lenhart et al., 2002 paper
March 5	Laboratory Session	Lab 2		
March 10	Mid-Term Exam			
March 12	Laboratory Session	Lab 2		
March 17	Management Operations, Plant Growth Cycle		Lab #2	pp 339-357, pp 287-337

March 19	Laboratory Session	Lab 3	Hmwk #3	
March 24	HOLIDAY – SPRING BREAK			
March 26	HOLIDAY – SPRING BREAK			
March 31	Nitrogen/Phosphorus Cycles			pp 181-214
April 2	Laboratory Session	Lab 3		
April 7	Pesticide Fate & Transport			pp 215-219 pp 353-354 pp 263-273 pp 431-442
April 9	Creation of GIS Data Layers, Laboratory Session	Lab 3	Hmwk #4	
April 14	Model Calibration and Validation		Lab #3	Chapter 33 of User's Manual
April 16	Laboratory Session	Lab 4		
 <i>To Be Scheduled:</i> Hinkson Creek Watershed Tour with Boone County SWCD and MDNR 319 Project				
April 21	Urban Areas			pp 367-377
April 23	Laboratory Session	Lab 4	Hmwk #5	
April 28	Example Projects			
April 30	Laboratory Session	Lab 4		
May 5	Reservoirs/Laboratory Session	Lab 4		pp. 449-494
May 7	Laboratory Session, Course Review	Lab 4	Lab #4	
May 8	READING DAY			
May 12	Final Exam from 1:00 to 3:00 p.m.			
