

Watershed Management I – Concepts in Watershed Hydrology and Management

March 6 – May 8, 2013

CEU Short Course offered by the Soil Science Society of America

Primary Instructor: Dr. Dawn R. Ferris, PSS (MN) and CPSS
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Additional Instructors: Guest instructors may be added periodically.

Course Description:

The objective of the course is to provide the student with an understanding of the concepts and practices in hydrology and watershed management. Concepts include the components and significance of the water budget, watershed hydrology, water flow and streamflow analyses, erosion and sedimentation, fluvial processes, water quality and corresponding environmental issues.

This course is meant to be the first of two courses in watersheds; the second of which will focus on watershed case studies and more in-depth evaluation of management practices along with implications for socioeconomics and the environmental policy and decision-making.

This course is taught via distance learning, and the instructor will supplement lecture readings and materials with additional readings and examples to illustrate the concepts and provide practical examples of how the concepts are used in practice.

Class Schedule/Time:

Consecutive Wednesdays starting March 6 for ten weeks; the course will conclude on Wednesday, May 8, 2013. Each class period will be 1.5 hours in length with a 5 minute break approximately half way through the class.

Class times will be Noon to 1:30 PM Eastern/ 11:00 AM to 12:30 PM Central/ 10:00 AM to 11:30 AM Mountain/ 9:00 AM to 10:30 AM Pacific.

Class periods will include the opportunity to ask questions during the lectures via a question log. Questions from the question log and the answers will be posted on the course website within a few days of the lecture.

To achieve the greatest benefit from this course, students will be expected to spend time reading and studying the assigned materials, completing the quizzes, and attending all the classes. The primary instructor may be contacted at any time via email with questions or comments.

Communications Requirements

High-speed internet connection
Email address
PC headset with microphone or PC microphone

Required Textbook (to be purchased or obtained by the student)

Hydrology and the Management of Watersheds. 2013. 4th Edition. K.N. Brooks, P.F. Ffolliott, J.A. Magner. John Wiley & Sons, Inc. 533 pp.

Note: Instructor may also add readings as needed, but these will be available on line or will be posted to the course website.

Supplemental Textbooks (not required but may be good reference material)

Environmental Hydrology. 2004. 2nd Edition. A.D. Ward and S.W. Trimble. Lewis Publishers.

Integrated Watershed Management: Principles and Practice. 2009. 2nd Edition. Isobel W. Heathcote. John Wiley & Sons, Inc.

Integrated Watershed Management: Connecting People to their Land and Water. 2007. H.M. Gregersen, P.F. Ffolliott, and K.N. Brooks. CAB International.

Student Directory Information

Student name, city/state/country, phone, and email will be included in a listing on the course website and will be available *only* to other Watershed Management students and those administering the course. Students can opt out of this listing when registering for the course.

Grading

A ten question quiz will be offered weekly that covers the materials from the previous week, available for students to take on-line during their own time. Individual performance on weekly quizzes will be provided confidentially to students to give an indication of the mastery of various topics. **No make-up quizzes will be offered.** There will not be a final exam for this course, and grades will not be assigned. Students who complete all 10 quizzes or accumulate at least 70 of the 100 quiz points (70%) can request a certificate of completion for the course. Missed quizzes will count as zero. Certified individuals seeking Continuing Education Units (CEUs) must achieve a passing score (at least 7 of 10) on a quiz to get credit for that particular session.

Quizzes will be posted on the class website by Friday each week and will be due the by the Tuesday following the next class (or 12 days later). **Access to quizzes will close at 11:59 PM central time; you will need to have completed AND submitted the quiz by that time in order for it to be assigned a score.** Print out your quizzes before you submit them for your reference and in case a score isn't recorded to be able to show that you took it. Note: The system allows you to take a quiz multiple times, but only your first score is counted.

Please make sure that you keep up with the quizzes! See class schedule (below) for availability and due dates of quizzes.

Quiz answers will be posted on the class website; the last two quizzes will be reported after the course has ended, but questions can be emailed to the instructor.

Class Web Site

Students registered for the course will have access to the class web site where the following will be posted:

- Lecture video recordings; audio with PowerPoint slides
- PowerPoint slides in pdf format
- Link to quizzes and answer keys to quizzes

Access to the class web site will begin February 27 and end one month following the last class period; June 8, 2013.

Class Schedule: Topics, Reading, and Quizzes (subject to modification):

Week	Topics	Reading Assignments to Supplement Lectures**
1	Watershed Management: Issues, Challenges and Underlying Science	Reading assignments refer to the required text by Brooks et al.
March 6	Introduction and housekeeping items Overview of watershed management complexities and the relationship between science and society.	Chapter 1 Quiz 1 available March 8
2	Underlying Principles and Processes	
March 13	Hydrologic Cycle Water/Energy Budgets Water Movement Basics	Chapter 2 Quiz 2 available March 15
3	Water Budget Components	
March 20	Precipitation: Measurement and Management Snow Hydrology Evaporation, Interception and ET	Chapter 3 and 4 Quiz 3 available March 22
4	Water Budget and Water Flow	
March 27	Evaporation, Interception and ET cont. Infiltration Water Flow and Recharge	Chapter 4 and 5 Quiz 4 available March 29
5	Surface Flow	
April 3	Water and streamflow Hydrographs Flow Pathways and Stormflow Response	Chapter 5 and Chapter 6 Quiz 5 available April 5

6	Flow Measurement and Analysis	
April 10	Structures and Monitoring Data and Estimating Discharge General Concepts in Groundwater	Chapter 6 and 7 Quiz 6 available April 12
7	Erosion and Sedimentation	
April 17	Erosion by Wind and Water - Processes Models for Erosion Prediction Erosion Control Sediment Transport	Chapter 8 and 9 Quiz 7 available April 19
8	Sedimentation and Fluvial Processes	
April 24	Sediment Transport cont. Sediment Yield and Watershed Effects Basic Concepts in Fluvial Geomorphology	Chapter 9 and 10 Quiz 8 available April 26
9	Stream Classification and Water Quality	
May 1	Stream Channel Stability Stream Classification Systems Interpretations and Management Introduction to Water Quality Concepts	Chapter 10 and 11 Quiz 9 available May 3
10	Water Quality and Impacts	
May 8	Precipitation and Water Quality Physical, chemical and biological pollutants Land Use and Water Quality	Chapter 11 Quiz 10 available May 10

Quiz Due Dates:

Quiz 1	March 19
Quiz 2	March 26
Quiz 3	April 2
Quiz 4	April 9
Quiz 5	April 16
Quiz 6	April 23
Quiz 7	April 30
Quiz 8	May 7
Quiz 9	May 14
Quiz 10	May 21

Instructor

Dr. Dawn Ferris

Dr. Dawn Ferris joined the SSSA staff in July 2010 as the Soil Science Program Coordinator. Previous to SSSA, she was a faculty member at The Ohio State University in the School of Environment and Natural Resources (SENR) where much of her research was located in Iceland studying successional landscapes, restoration and soil carbon. She still maintains an adjunct faculty position within SENR. Prior to her position at OSU, Dr. Ferris spent the majority of her career in environmental consulting and, for a shorter time, in county government where she spent much of her time working in watershed management, natural resource management, environmental review documents and permitting. During her career she has, among other things, owned her own consulting business, managed the MN office of Tetra Tech, and traveled across the U.S. as part of her work. She has a B.S. in soil science from the University of Wisconsin, a M.S. in soil physics and a PhD in Forest Hydrology from the University of Minnesota. Dr. Ferris is both a licensed and certified soil scientist and has worked on issues surrounding the implementation of these programs since the early 1990s.

Briefly, some of the primary objectives of Dr. Ferris's position with SSSA include overseeing the soil science licensing and certification programs for SSSA (including legislative issues), facilitating continuing education for soil scientists, and to overall help to grow the soil science profession by working with and facilitating communication between the private sector, government and academia.