NRM F370 Introduction to Watershed Management

Fall 2017
3 Credits

Instructor: Norman R. Harris
UAF Matanuska Experiment Farm
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Contact Information

Office Hours: 10:00 to 12:00 PM Mondays or by appointment. I maintain an open-door policy. If I am in, I can usually talk.

E-mail: nrharris@alaska.edu Please include "Watershed Class" in the subject line, so you do not get buried in my email!

Phone: (907) 746-9475 (Leave a message if I am not in and I will get back to you)

Prerequisites: NRM F101 or permission of instructor. Recommended: NRM F375, F380

- **Text:** **Hydrology and the Management of Watersheds**, K.N. Brooks, P.F Ffolliott, J.A. Magner. 4th Edition, Wiley-Blackwell Publishing, ISBN-10: 0470963050, ISBN-13: 978-0470963050

Course Objectives:

1) Introduce students to integrated watershed management as an applied ecological treatment of the complex relationships between soil, plants, animals and land use practices to achieve sustainable development and use of land and water resources.

2) Describe the abiotic and biotic elements of watersheds along with the functions and processes associated with them.

3) Develop a watershed analysis relating to an Alaskan watershed using spatial technologies and information from class lectures.

Class Format:

This class consists of 29 lecture sessions (1 hour each) along with 12 laboratory sessions (approx. 3 hours each). The lecture sessions are led by the instructor. The laboratory sessions are comprised of instructor-narrated GIS exercises using watershed analytical techniques, guest lecturers and student-led discussion groups. The class will be offered at both the Fairbanks campus and the Matanuska Experiment Farm in Palmer via a real-time video link with the instructor occasionally switching to teach from both ends. Most classes will be taught from Palmer. This is pushing the technology to its maximum and

there may (will?) be trying and frustrating periods involved, so please be patient. . Course materials will be transmitted using the Blackboard system (http://classes.uaf.edu/) and assignments will be turned in using email.

Ten short "pop" quizzes (10 points each) will be given, unannounced, during the term and two scheduled 1-hour exams (50 points each) will be given during the term. A required 2-hour final exam (200 points) will be given at the end of the term.

The Watershed Assessment Team (WAT) Project (200 points) consists of the following components:

- Completion and submission of nine GIS exercises* (90 points)
- Individual assignment (fill role as facilitator/reporter for WAT meetings) (10 points)
- Contributions to watershed assessment report (100 points)

* Computers with GIS software are available in O'Neill 359 and at any of the OIT computer labs in MBS, Bunnell (the Nook), or the library (Rasmussen 404). GIS software is also provided to students for use on suitable personal computers.

The instructor will award 40 points based on class participation. Your attendance at all lectures is expected and would be a great ego boost. So remember,

AN INSTRUCTOR WITH AN INFLATED EGO IS AN EASY GRADER!!!

Testing and grading:

"Pop" quizzes (10)	100 points
Two 1-hour exams	100 points (50 points each)
Final exam	200 points
Watershed Assessment Project	200 points
Class Participation	40 points
Total	640 points

Grading Scale:	Percentage (rounded to nearest integer)
A	100 – 90
B	89 – 80
C	79 – 70
D	69 – 60
F	<60

Academic Integrity – UA Policy

Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as and intentional act of deception in one of the following areas:

- Cheating – use or attempted use of unauthorized materials, information or study aids

- Fabrication – falsification or invention of any information
- Tampering – altering or interfering with evaluation instruments and documents
- Plagiarism – representing the words or ideas of another person as one's own
- Assisting – helping another commit an act of academic dishonesty

Students participating in any of the above actions will be referred to the Dean of Student Affairs.

Disabilities Services

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.

Session Schedule and Content

NRM F370 Introduction to Watershed Management
Lecture: 11:30 am – 12:30 pm, Tuesday and Thursday, AHRB 183 (Fairbanks) and Distance Delivery Center (Palmer)

Lecture	Date	Topic	Readings/Assign
1	Aug. 29	Introduction and Class Logistics	Chapter 1
2	Aug. 31	Sustainability and Integrated Watershed Management	
3	Sept. 5	The Hydrologic Cycle and Water Budget	Chapter 2
4	Sept. 7	Energy and the Hydrologic Cycle	
5	Sept. 12	Precipitation: Rain and Snow	Chapter 3
6	Sept. 14	Water Losses from the Watershed: Evaporation, Interception and Transpiration	Chapter 4
7	Sept. 19	Water Losses (continued)	
8	Sept. 21	Pathways of Water Flow	Chapter 5
9	Sept. 26	Streamflow Measurement and Analysis	Chapter 6
10	Sept. 28	Groundwater	Chapter 7
11	Oct. 3	Groundwater versus Surface Water, Review for exam	
12	Oct. 5	**Part 1 Exam**	
13	Oct. 10	Soil Erosion Processes	Chapter 8
14	Oct. 12	Sediment Supply, Transport and Yield	Chapter 9
15	Oct. 17	Fluvial Processes	Chapter 10
16	Oct. 19	Stream Channel Form, Function and Stability	
17	Oct. 24	Water-Quality Considerations	Chapter 11
18	Oct. 26	Water-Quality (continued), Review for exam	
19	Oct. 31	**Part 2 Exam**	
20	Nov. 2	Managing Wildland Watersheds	Chapter 12
21	Nov. 7	Managing Wildland Watersheds (continued)	
22	Nov. 9	Managing Riparian Zones and Wetlands	Chapter 13
23	Nov. 14	Managing Riparian Zones and Wetlands (continued)	
24	Nov. 16	Watershed Management Issues	Chapter 14
25	Nov. 21	Watershed Management Issues (continued)	
26	Nov. 28	Socioeconomic Considerations	Chapter 15
27	Nov. 30	Socioeconomic Considerations (continued)	
28	Dec. 5	New Technologies	Chapter 16
29	Dec. 7	Wrap-up and Review for Final Exam	
	Dec. 12	**Final Exam (10:15 am to 12:15 pm)**	

Lab: 8:30 – 11:30 am, Friday, AHRB 183 (Fairbanks) and DDC (Palmer)

Laboratory	Date	Topic
1	Sept. 8	**Project Initiation:** Watershed Assessment Team (WAT) section assignments, Develop Workflow and Data Requirements **GIS Background**
2	Sept. 15	**WAT Meeting:** Identify Watershed Problems, Develop Goals and Objectives **GIS Lab 1** – Delineation of a Watershed Boundary **Guest Lecture:** TBD
3	Sept. 22	**WAT Meeting:** **GIS Lab 2** – Extraction of Raster Layers using the Watershed Mask **Guest Lecture:** Jeff Falke (UAF Assistant Professor School of Fisheries and Ocean Sciences/Assistant Leader, AKCFWRU)
4	Sept. 29	**WAT Meeting:** **GIS Lab 3** – Extraction of Hydrology Data, Editing of Shapefiles, and Determining and Entering the Strahler Order **Guest Lecture:** Mark Clark (Retired NRCS Soil Scientist)
5	Oct. 6	**WAT Meeting:** **GIS Lab 4** – Terrain Analysis and Creation of Indices **Guest Lecture:** Bill Collins (Alaska Dept. of Fish and Game Wildlife Biologist)
6	Oct. 13	**WAT Meeting:** **GIS Lab 5** – Landform Mapping **Guest Lecture:** Dot Helm (Retired UAF Vegetation Ecologist)
7	Oct. 20	**WAT Meeting:** **GIS Lab 6** – Bringing Agency Data into GIS Database
8	Oct. 27	**WAT Meeting:** **GIS Lab 7** – Minimum Eroded Volume, Watershed Cross-sections and Display Using ArcScene **Guest Lecture:** Alex Strawn (Matanuska-Susitna Borough Development Services Manager)
9	Nov. 3	**WAT Meeting:** **GIS Lab 8** – Image Processing, Aerial Photography and Satellite Imagery **Guest Lecture:** Wayne Biessel (Alaska State Parks Superintendent – Mat-Su/Copper River Area)
10	Nov. 10	**WAT Meeting:** Section reports, submission of rough draft **GIS Lab 9** –Temporal Analysis of Satellite Imagery and Importing Geotagged Imagery **Guest Lecture:** Fran Seager-Boss (Retired Matanuska-Susitna Borough Cultural Resources Specialist and Lead Archeologist)
11	Nov. 17	**WAT Meeting:** Review and discussion of rough draft
12	Dec. 1	**WAT Meeting:** Project wrap-up, submission of final report