NRM F370 Introduction to Watershed Management

Fall 2018
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 on the third floor of O'Neill 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
I	Incomplete; missing tests and/or final exam

Plus "+" and minus "-"grades are not given in this class, therefore a grade of "C" (2.0) is the minimum acceptable grade that undergraduate students may receive for this course to count toward major or minor degree requirements, or as a prerequisite for another course.

Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy: The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, he or she has not been able to complete the course during the regular semester. Negligence and indifference are not acceptable reasons for an "I" grade.

Academic Integrity – UA Policy

Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an 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 given an incomplete in the course and referred to the Dean of Student Affairs.

UAF eLearning Student Services

Helps students with registration and course schedules, provides information about lessons and student records, assists with the examination process, and answers general questions. Our Academic Advisor can help students communicate with instructors, locate helpful resources, and maximize their distance learning experience. Contact the UAF eLearning Student Services staff at 907. 479.3444 or toll free 1.800.277.8060 or contact staff directly – for directory listing see: http://elearning.uaf.edu/contact

Disabilities Services

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (208 WHITAKER BLDG, 474-5655) to provide reasonable accommodation to students with disabilities. http://uaf.edu/disability/

Effective communication

Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (Phone 907-474-5470, email speak@uaf.edu) and the UAF English's Department's Writing Center (Phone 907-474-5314, location Gruening 8th floor).

Research Help

Contact the Elmer E. Rasmuson Library at UAF reference desk for help with research. http://library.uaf.edu or 907-474-7481

UAF Help Desk

Go to http://www.alaska.edu/oit/ to see about current network outages and news. Reach the Help Desk at: e-mail at helpdesk@alaska.edu or phone: 450.8300 (in the Fairbanks area) or 1.800.478.8226 (outside of Fairbanks)

Title IX

See http://www.uaf.edu/oeo/civil-rights/aa-eo/ University of Alaska Board of Regents have clearly stated in BOR Policy that discrimination, harassment and violence will not be tolerated on any campus of the University of Alaska If you believe you are experiencing discrimination or any form of harassment including sexual harassment/misconduct/assault, you are encouraged to report that behavior. If you report to a faculty member or any university employee, they must notify the UAF Title IX Coordinator about the basic facts of the incident. Your choices for reporting include: 1) You may access confidential counseling by contacting the UAF Health & Counseling Center at 474-7043; 2) You may access support and file a Title IX report by contacting the UAF Title IX Coordinator at 474-6600; 3) You may file a criminal complaint by contacting the University Police Department at 474-7721.

Discrimination

UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: www.alaska.edu/nondiscrimination.

Session Schedule and Content

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

Lecture	Date	Topic	Readings/Assign
1	Aug. 28	Introduction and Class Logistics	Chapter 1
2	Aug. 30	Sustainability and Integrated Watershed Management	
3	Sept. 4	The Hydrologic Cycle and Water Budget	Chapter 2
4	Sept. 6	Energy and the Hydrologic Cycle	
5	Sept. 11	Precipitation: Rain and Snow	Chapter 3
6	Sept. 13	Water Losses from the Watershed: Evaporation, Interception and Transpiration	Chapter 4
7	Sept. 18	Water Losses (continued)	
8	Sept. 20	Pathways of Water Flow	Chapter 5
9	Sept. 25	Streamflow Measurement and Analysis	Chapter 6
10	Sept. 29	Groundwater	Chapter 7
11	Oct. 2	Groundwater versus Surface Water, Review for exam	
12	Oct. 4	**Part 1 Exam**	
13	Oct. 9	Soil Erosion Processes	Chapter 8
14	Oct. 11	Sediment Supply, Transport and Yield	Chapter 9
15	Oct. 16	Fluvial Processes	Chapter 10
16	Oct. 18	Stream Channel Form, Function and Stability	
17	Oct. 23	Water-Quality Considerations	Chapter 11
18	Oct. 25	Water-Quality (continued), Review for exam	
19	Oct. 30	**Part 2 Exam**	
20	Nov. 1	Managing Wildland Watersheds	Chapter 12
21	Nov. 6	Managing Wildland Watersheds (continued)	
22	Nov. 8	Managing Riparian Zones and Wetlands	Chapter 13
23	Nov. 13	Managing Riparian Zones and Wetlands (continued)	
24	Nov. 15	Watershed Management Issues	Chapter 14
25	Nov. 20	Watershed Management Issues (continued)	
26	Nov. 27	Socioeconomic Considerations	Chapter 15
27	Nov. 39	Socioeconomic Considerations (continued)	
28	Dec. 4	New Technologies	Chapter 16
29	Dec. 6	Wrap-up and Review for Final Exam	
	Dec. 13	**Final Exam (10:15 am to 12:15 pm)**	

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

Laboratory	Date	Topic
1	Sept. 7	**Project Initiation:** Watershed Assessment Team (WAT) section assignments, Develop Workflow and Data Requirements **GIS Background**
2	Sept. 14	**WAT Meeting:** Identify Watershed Problems, Develop Goals and Objectives **GIS Lab 1** – Delineation of a Watershed Boundary **Guest Lecture:** TBD
3	Sept. 21	**WAT Meeting:** **GIS Lab 2** – Extraction of Raster Layers using the Watershed Mask **Guest Lecture:** TBD
4	Sept. 28	**WAT Meeting:** **GIS Lab 3** – Extraction of Hydrology Data, Editing of Shapefiles, and Determining and Entering the Strahler Order **Guest Lecture:** TBD
5	Oct. 5	**WAT Meeting:** **GIS Lab 4** – Terrain Analysis and Creation of Indices **Guest Lecture:** TBD
6	Oct. 12	**WAT Meeting:** **GIS Lab 5** – Landform Mapping **Guest Lecture:** TBD
7	Oct. 19	**WAT Meeting:** **GIS Lab 6** – Bringing Agency Data into GIS Database **Guest Lecture:** TBD
8	Oct. 26	**WAT Meeting:** **GIS Lab 7** – Minimum Eroded Volume, Watershed Cross-sections and Display Using ArcScene **Guest Lecture:** TBD
9	Nov. 2	**WAT Meeting:** **GIS Lab 8** – Image Processing, Aerial Photography and Satellite Imagery **Guest Lecture:** TBD
10	Nov. 9	**WAT Meeting:** Section reports, submission of rough draft **GIS Lab 9** –Temporal Analysis of Satellite Imagery and Importing Geotagged Imagery **Guest Lecture:** TBD
11	Nov. 16	**WAT Meeting:** Review and discussion of rough draft
12	Nov. 30	**WAT Meeting:** Project wrap-up, submission of final report