SYLLABUS SPRING 2020

Instructor:
JeanMarie Hartman
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New Brunswick, NJ 08903
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Class Website: on http://sakai.rutgers.edu – named Watershed Management 2020

Meeting Times/Places:

Lecture: T 6:00-8:00 (Blake 128)
Office Hours: By appointment

Required Texts:

None

Course Description:

This is an advanced course intended to provide opportunities for students from a broad range of disciplines to master the natural science, social science, and policies of watershed management.

The first half of the course is focused on knowledge of watershed structure and function, as they change from wilderness to rural to suburb to urban settings. Basic introductions of ecosystem science, basic geology, and hydrology are combined into models of watershed structure and function and water quality. The relationships between land use and land management practices to water quality and quantity are also investigated through models.

By the mid-term, students begin research on the status of individual sub-watersheds in New Jersey. They read published Watershed Management Plans that have been approved by NJDEP and those that are under review. From those plans, they determine sub-watersheds with interesting management challenges. As the lectures continue to present examples from well-developed watershed programs, students research small sub-watersheds and begin to develop current literature and recommendations for new programming. Final oral presentations and term papers, on specific sub-watersheds, give students the opportunity to demonstrate their knowledge of the principles of watershed management and an example of how they can apply the principles.

Grading:

20% Class Activities, Quizzes, and Homework
30% Test 1
50% Development, research, oral presentation and term paper.

Course Lectures (DRAFT)

January 21	Introduction to watersheds
January 28	Watershed ecology
February 4	Steve Yergeau– Watershed Hydrology
February 11	Biogeochemical Cycles in watersheds
February 18	The Lower Raritan Watershed (Heather Fenyk)
February 25	Test and project updates
March 3	Steve Yergeau -Water Quality Standards
March 10	Literature Discussion/Topic Discussion
March 17	SPRING RECESS
March 24	Case Studies
March 31	Case Studies
April 7	The Raritan Basin
April 14	Case Studies
April 21	Final Presentations
April 28	Final Presentations
May 8	Papers due by on sakai 11:59PM

Paper Assignment: The steps to writing a term paper are given in a logical sequence, beginning with assignment of a subwatershed, development of a literature review, and posing of a term paper topic. Outline development and writing of sections of the paper are cycled with editorial reviews and rewriting.

Outline

I. Introduction

Describe an issue that is important to the watershed management of the Lower Raritan Basin. This section of your paper should be about 300 to 500 words.

II. Literature review

Write a literature review, in your own words. Begin your review by defining your topic and explaining why it is relevant to the Lower Raritan Watershed Partnership. Within the review, rely heavily on recent papers (>50% from 2007-2016) that explain the current state of knowledge on your topic. Use

older references to show how our ideas have changed and to include classic or pivotal papers. You can use tables or figures from your cited papers, just be sure that you give the citation with any figure or table you include.

Be sure to include discussion of what the literature says about gaps in knowledge with respect to your chosen issue. This section of the document should be 3000 to 4000 words in length. (This includes the bibliography and any captions that you add to figures and tables.)

III. Issue as it applies to the Lower Raritan

How is the information in your review related to the problems faced in the Lower Raritan Basin? What particular papers are especially important in providing pertinent information? What have you personally observed in the area?

This section of your paper should be at least 300 words.

IV. Proposal of approach for addressing issue in the Lower Raritan

How can the LRWP address this issue? What is known about the issue in this area? What else do they need to know and how can they find this information? What are the sensitive or political or educational issues? How can they start? What are reasonable expectations? What are some practical short term goals? What is the long term goal and why?

This section of the document should be 3000 to 4000 words in length. (This includes the bibliography and any captions that you add to figures and tables.)

V. References

Include all of the peer reviewed and other sources you have used in developing your topic and writing your literature review. There should be at least **5 recent** (2006 or more recent) peer reviewed papers and a total of **ten** peer reviewed papers (including the 5 mentioned above) plus books, news, weblinks, etc. Use APA citation format.

ASSESSMENT PLAN for Watershed Management 11:372:444 3credits)
October 2018 J.M.Hartman, Ph.D.

Learning Goals

- Analyze a contemporary global issue from a multidisciplinary perspective.
- Analyze the relationship that science and technology have to a contemporary social issue.
- Understand and apply basic principles and concepts in physical and biological sciences.
- Evaluate and critically assess sources and use the convention of attribution and citation correctly.
- Analyze and synthesize information and ideas from multiple sources.

Learning Objectives

1) Students gain an understanding of the spatial organization of the physical and biological processes that shape a watershed through a multidisciplinary perspective and as it relates to global environmental issues.
2) Students gain a working knowledge of watershed policy and management as it relates to the translation of science to policy and regulation.
3) Students develop practical experience in problem solving and the use of analytic reasoning through evaluating and developing a research topic that applies global issues to a local watershed.
4) Students gain an appreciation of historical and cultural diversity in the way humans code, map, and interpret their environment through the evaluation and study of attitudes in a local watershed.

Learning Objectives and Assessments

1) Students gain an understanding of the spatial organization of the physical and biological processes that shape a watershed. **Assessment**: Students are assigned EPA Tutorial modules that present this information. The framework of the EPA reading is enhanced during lectures by drawing on current events and local examples. During lectures, class discussion is generated by posing questions about expectations, preferences, and opinions. Participation in discussion is noted. Quizzes are substituted if discussion participation is low. Exams survey knowledge of material and ability to interpret and apply knowledge (in short essay questions). (EXAM 1)

2) Students gain a working knowledge of watershed policy and management. **Assessment**: Lectures, videos and reading assignments will convey information to students. A glossary of terms is developed through the lecture sequence. Current debate on watershed management is brought into the classroom for discussion. Guest lectures by local and regional experts provide a range of examples of issues, problems, and successes in building watershed organizations and watershed management programs. (EXAM 1)

3) Students develop practical experience in problem solving and the use of analytic reasoning through evaluating and developing and watershed management plan. **Assessment**: Students will be assigned to individual sub-watersheds in New Jersey for research. The research will include use of peer reviewed literature as well as visits to local organizations in their area of study. Classroom debates will be encouraged by giving students different materials to read and discuss in class or through role playing. The debate will demonstrate students' awareness of consequences of each decision in their path of analytic reasoning. (Term Paper)

4) Students gain an appreciation of historical and cultural diversity in the way humans code, map, and interpret their environment. **Assessment**: Through the study of a 25 to 75 sq. mile area in New Jersey, students become familiar with communities and their history, especially as it relates to their water resources and its management. The social and cultural information is essential to the development of a watershed management plan, because, as it turns out, the plan will be more about managing and educating people than managing water itself.

Assignments, Quizzes, Tests, Class Discussion

Assignments: The term paper starts early in the semester and begins to dominate the class by the time of the mid-term exam. In this way, the students can begin to identify areas of interest within watershed management and spend time becoming familiar with a watershed through site visits. As the time for paper topics to be submitted, the class is able to engage in critical and analytic discussion of potential paper topics. The research for the paper is recorded in an on-line journal and shared with classmates and the instructor, to allow for guidance and feedback. The outline for the paper is presented through the journal, as are early drafts of each section of the paper. Students are required to give and get feedback as part of this exercise. This enlivens the discussion and supports the ongoing criticism that will make the paper successful.

Quizzes: Several short quizzes are used to make sure students understand the material shortly after it has been assigned as reading and presented in lecture. Some of the questions re-appear on the test, to encourage the students to review and learn the correct answers.

Tests: The hourly test uses fill-in the blank and multiple choice questions to test basic knowledge of terminology and concepts. Short essays require students to apply concepts to new information or situations.

Class Activities: There are two formats for class discussion. Questions are posed and discussed during most lectures. The same questions and additional questions are posted in a Forum on the sakai.rutger.edu site. In both cases, students are asked to identify themselves and get credit for meaningful contributions.

https://www.epa.gov/watershedacademy/online-training-watershed-management#themes

Introductory/Overview Modules
Sustaining Healthy Aquatic Ecosystems
* Ecosystem Services: Benefits to Human Societies by Natural Ecosystems
"Why Watersheds?"
Ohio's Online Virtual Watershed Tour
Watershed Ecology Modules
* Introduction to Watershed Ecology | Printable Version (PDF)(37 pp, 1.8 MB)
* Protecting Instream Flows: How Much Water Does a River Need? | Printable Version (PDF)(22 pp, 1.2 MB)
* Stream Corridor Structure | Printable Version (PDF)(34 pp, 8.0 MB)
Birds: Bellwethers of Watershed Health | Printable Version (PDF)(24 pp, 1.7 MB)
Wetland Functions and Values | Printable Version (PDF)(23 pp, 1.3 MB)
Understanding Lake Ecology
The Role of Nearshore Ecosystems as Fish and Shellfish Nurseries
Watershed Change Modules
* Understanding Climate Change Impacts on Water Resources | Printable Version (PDF)(53 pp, 7 MB)
Local Government Climate Adaptation Training Online Module
* Agents of Watershed Change | Printable Version (PDF)(49 pp, 3.2 MB)
Growth and Water Resources
* Nonpoint Source Pollution with Nitrogen and Phosphorus
Watersheds: Connecting Weather to the Environment
Weather and the Built Environment
Dealing with Drought
Invasive Non-Native Species
Excess Nitrogen in the U.S. Environment: Trends, Risks and Solutions
Biotic Invasions: Causes, Epidemiology, Global Consequences and Control
Effects of Aquaculture on World Fish Supplies
Analysis and Planning Modules
* Introduction to Watershed Planning | Printable Version (PDF)(46 pp, 2.5 MB)
* Overview of Watershed Monitoring | Printable Version (PDF)(33 pp, 4.3 MB)
Rapid Bioassessment Protocols | Printable Version (PDF)(34 pp, 2.1 MB)
Watershed Ecological Risk Assessment | Printable Version (PDF)(34 pp, 2.0 MB)
Watershed Modeling | Printable Version (PDF)(35 pp, 8.9 MB)
Fundamentals of Rosgen Stream Classification System
Training in Use of the National Hydrography Dataset (NHD) and NHDPlus
Management Practices Modules
* 8 Tools of Watershed Protection in Developing Areas | Printable Version (PDF)(30 pp, 2.7 MB)
* Agricultural Management Practices for Water Quality Protection | Printable Version (PDF)(54 pp, 2.7 MB)
*Forestry Best Management Practices in Watersheds | Printable Version (PDF)(47 pp, 4.9 MB)
Stream Corridor Restoration Tools
Restoration: What's Right or Wrong with This Picture?
Applying Ecological Principles to Management of the U.S. National Forests
Community and Social Modules
Sustainable Finance Module | Printable Version (PDF)(75 pp, 1.0 MB)
* Getting in Step: a Guide to Effective Outreach in Your Watershed | Printable Version (PDF)(49 pp, 2.4 MB)
* Top 10 Watershed Lessons Learned
Water in a Changing World
Statewide Watershed Management | Printable Version (PDF)(21 pp, 1.6 MB)
Monitoring Consortiums
Grade K through 12 Watershed Learning Links
Water Law Modules
* Introduction to the Clean Water Act | Printable Version (PDF)(90 pp, 4.99 MB), Spanish Version(101 pp, 4.8 MB)
Key Concepts of Water Quality Standards
Listing Impaired Waters and Developing TMDLs
NPDES Permit Program

ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at http://academicintegrity.rutgers.edu/academic-integrity-policy. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

STUDENT WELLNESS SERVICES

Just In Case Web App http://codu.co/cee05e

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / https://ods.rutgers.edu/

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.

Scarlet Listeners

(732) 247-5555 / http://www.scarletlisteners.com/

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.