SYLLABUS SPRING 2018

Instructor:
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Class Website: on http://sakai.rutgers.edu – named Watershed management 2018

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:

15% Participation, Quizzes, and Homework
35% Test 1
50% Development, research, oral presentation and term paper.

Course Lectures (DRAFT)

January 16	Introduction to watersheds
January 23	Watershed ecology
January 30	Steve – Watershed Hydrology
February 6	Biogeochemical Cycles in watersheds
February 13	Steve Yergeau -Water Quality Standards
February 20	The Lower Raritan Watershed
February 27	Literature Discussion/Topic Discussion
March 6	Test and project updates
March 13	SPRING RECESS
March 20	Case Studies
March 27	Case Studies
April 3	The Raritan Basin
April 10	Case Studies
April 17	Final Presentations
April 24	Final Presentations
May 7	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 2012 J.M.Hartman, Ph.D.

Learning Goals

21st Century Goals

- Analyze a contemporary global issue from a multidisciplinary perspective.
- Analyze the relationship that science and technology have to a contemporary social issue.

Natural Sciences

- Understand and apply basic principles and concepts in physical and biological sciences.
- Identify and critically assess ethical and societal issues in science.

Writing and Communication

- Communicate complex ideas effectively, in standard written English, to a general audience.
- Respond effectively to editorial feedback from peers, instructors, and or supervisors through successive drafts and revisions.
- Communicate effectively in modes appropriate to a discipline of inquiry.
- 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.
2) Students gain a working knowledge of watershed policy and management.
3) Students develop practical experience in problem solving and the use of analytic reasoning through evaluating and developing and watershed management plan.
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 Participation: There are two formats for class discussion. Questions are posed and discussed a one or two points 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.