

SYLLABUS: Strategies in Watershed Management, 420.660.81 Summer 2019

COURSE DESCRIPTION: This 12-week summer course explores watersheds as integrators that connect the natural and human resources in an area. As water and the materials it carries flow from headwaters to river mouths, habitats are created, nutrients are delivered, waste products are processed, crops are irrigated, and water supplies are delivered. The course comprises twelve on-line lessons, one for each of the weeks during the summer session. It is suggested that each weekly lesson begins on a Wednesday and ends on the following Tuesday, although there is flexibility to follow lessons and turn in assignments outside of the suggested weekly schedule. Each lesson includes topical content, web pages to visit, readings in the required text, and a quiz. Nine of the lessons also have discussions, and some have other assignments. Other graded assignments include a 1-paragraph research and writing proposal, a non-technical summary of the research and writing topic, and a final paper. The non-technical summary simulates a communication to a non-technical audience and may take the form of a slide show, brochure, letter, video, flyer, poster, or other similar format. The final paper, on the same topic, is a brief essay, in a more technical and scientific vein, on your research and writing topic.

Students are introduced to definitions of "watershed" and "watershed management" in the context of natural resources science and policy. As we analyze various environmental problems encountered in watersheds, we will incorporate into the analysis information from natural and social science, legal, and economic frameworks. In effect we will use watersheds and watershed management to devise bridges between the realms of policy and sciences.

There is a brief review of basic hydrology, a look at the history of watershed management, and examination of the institutions and legislation that affect watershed management. Understanding these environmental policy making processes, institutions, and organizations, in relation to the specific threats to watershed health, will help to identify root and structural causes and the systemic nature of such environmental problems.

We discuss sources of information to guide watershed managers, and methods for collection, analysis, presentation and critical interpretation of such environmental information, using appropriate statistical and quantitative tools.

We also discuss practices that can ameliorate the threats. Through case histories, the students are exposed to the collaborative process for assessing, protecting, and restoring watersheds. In this way we will evaluate effective strategies, technologies, and methods for sustainable management of these environmental systems and for the remediation or restoration of degraded environments in conjunction with evidence-based, science-informed environmental policy analysis.

INSTRUCTOR: Glenn Patterson, gpatter5@jhu.edu, 970-586-5196. Feel free to call between 10:00 am and 11:00 pm Eastern Time. I will try to respond to email and phone messages within 24-48 hours.

COURSE GOALS:

* To understand watersheds as organizing units for natural resource science and management.

* To identify threats to watershed health, and learn ways to ameliorate those threats.

DISCIPLINE: Environmental Science and Policy

REQUIRED TEXT: Integrated Watershed Management: Principles and Practice 2nd edition, by Isobel W. Heathcote, John Wiley & Sons, 2009.

UNIVERSITY POLICIES

GENERAL: This course adheres to all University policies described in the academic catalog. A few to pay close attention to are noted below. JHU Ethics Statement: The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor.

PLAGIARISM

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments prepared for other courses, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. **To avoid plagiarism in your writing, any time you copy more than 7 consecutive words written by someone else (for example, from a web site), you should enclose the copied material in quotes and provide a citation to the source.** Report any violations you witness to the instructor. Read and adhere to JHU's [Notice on Plagiarism](#).

POLICY ON LEVEL OF EFFORT IN THIS COURSE: As your instructor, I am committed to being a frequent and helpful presence during the course, logging in on average once every other day to participate in discussions and respond to email. I expect you to dedicate the same level of interest and effort you would give to a classroom course, and stay current with the schedule of lessons, averaging one per week.

STUDENTS WITH DISABILITIES: Johns Hopkins University is committed to providing reasonable and appropriate accommodations to students with disabilities. Students with documented disabilities should contact the coordinator listed on the [Disability Accommodations](#) page. Further information and a link to the Student Request for Accommodation form can also be found on the [Disability Accommodations](#) page.

DROPPING THE COURSE: You are responsible for understanding the university's policies and procedures regarding withdrawing from courses found in the current catalog. You should be aware of the current deadlines according to the [Academic Calendar](#).

TECHNICAL ASSISTANCE: You have a variety of methods to get help on Blackboard. Please consult the help listed in the 'Technical Help' link for important information. If you encounter technical difficulties in completing or submitting any online assessment, IMMEDIATELY

contact the 24/7 Help Desk at **855-593-0086**, use the live chat at the link provided on <http://advanced.jhu.edu/academics/online-programs/support/> or submit a web ticket available on the same website. Please also let your instructor know immediately, via email, that you are experiencing technical issues.

COURSE ETIQUETTE OR “NETIQUETTE”: This is a professional educational program and your communications are expected to be in accordance with normal professional standards. Please show respect for your audience, and use the writing skills you have been developing throughout your academic and professional training. In email messages, please specify the course number in your subject line, and sign the message with your full name.

GRADING: Grading will be based on 500 points, distributed as follows:

- 12 quizzes, 18 points each,
- 9 discussions, 20 points each,
- 1 research and writing proposal, 14 points,
- 1 non-technical summary, 30 points, and
- 1 final paper, 60 points, for a total of 500 points.

Quizzes are open-book, with no set time limit, but you may take each quiz only once. The roundtable discussions are the heart of the course, and you will be expected to participate on a regular basis. The goal of the discussions is to let you share the insight you have gained about how science and public policy have come together to help solve watershed management problems. The problems do not have easy answers, and there is room for varying opinions in the discussions, as long as the opinions are supported. The grading scale is as follows:

- 98–100% (490-500 points) A+
- 93–97% (465-489 points) A
- 90–92% (450-464 points) A-
- 87–89% (435-449 points) B+
- 83–86% (415-434 points) B
- 80–82% (400-414 points) B-
- 76–79% (380-399 points) C
- <76% (0-379 points) F

RESEARCH AND WRITING ASSIGNMENTS:

- (1) Research and Writing Proposal: During Lesson 4 (Week 4) you will turn in a 1-paragraph proposal describing the watershed management topic you would like to select for your research and writing projects. This can be on any topic of your choice related to an unsolved problem pertaining to watershed management. (14 points)
- (2) Non-Technical Summary: During Lesson 8 (Week 8) you will turn in a non-technical summary of the results of your research and writing work. This will be in the form of a communication intended for a non-technical audience such as the general public, an elected official, a city or county council, etc, and may be in the form of a slide show, brochure, poster, flyer, video, letter, podcast, etc, aimed at a non-technical audience. (30 points)

(3) Final Paper: Your final paper will be due at the end of Lesson 12 (Week 12). It does not need to be as comprehensive as a term paper, but you are expected to write a scholarly paper of 3 to 4 pages (single spaced) about the results of your research and writing work. The goal is to evaluate and synthesize scientific studies to guide environmental decision making, policy making, and advocacy pertaining to watersheds. You will utilize the practical and theoretical components of environmental science and policy to develop local and global environmental strategies to improve management of your selected watershed. The paper will be graded on content (30 points), organization (15), readability (10), and references (5). Please use footnotes or short references in parentheses to indicate specific information that is derived from the references, and list the full references at the bottom. If you use material written by someone else, that material should be in quotes and should be attributed to the author. Please strive to have 20 percent of your references be academic references as you would find in a graduate-level academic library, such as refereed journals. (60 points)

OPTIONAL EXTRA CREDIT ACTUAL FIELD TRIP

You may earn up to 5 extra-credit points by taking your own, self-guided actual field trip in your home watershed or one close to you. See “Optional Field Trip” on the Discussions page for more details.

OPTIONAL EXTRA CREDIT EXERCISE ON CLIMATE CHANGE

You may earn up to 10 extra-credit points by completing this optional extra-credit exercise on the projected impact of climate change on hydrology. See details under “Assignments”.

COURSE CONTENT:

Lesson 1 (Week 1) Basic Watershed Hydrology

Topics: What is a watershed?
 What is watershed management?
 Basic hydrology and water of the world Watershed delineation

Text Reading: Preface and Chapter 1, Introduction

Assignment: Delineate a watershed

Discussion: None

Lesson 2 (Week 2) Visit a watershed

Topics: Virtual tours of at least two watersheds. Optional visit to your own watershed.

Text Reading: Chapter 2, The Watershed Inventory

Assignment: Take at least two virtual watershed tours

Discussion: Contrast two or more watersheds based on the tours.

Lesson 3 (Week 3) An historical look at watershed management

Topics: A brief look at human interventions to manage water flow or quality

Text Reading: None

Assignment:	Read on-line historical references contained in the lesson
Discussion:	Comment on a trend over time in watershed management, or describe the contributions of a noted figure in watershed management.
Lesson 4 (Week 4)	Watersheds and Institutions
Topics:	The key players in watershed management
Text Reading:	Chapters 3 and 4
Assignment:	Contribute to a list of key players in watershed management
Discussion:	Discuss the need for interaction among multiple entities for successful watershed management
Research & Writing Assignment	Turn in a 1-paragraph description of your proposed R & W topic.
Lesson 5 (Week 5)	Threats related to water quantity
Topics:	Diversions, impoundments, ground-water depletion, urbanization, and levees and channelization
Text Reading:	None
Assignment:	Read on-line references contained in the lesson
Discussion:	Describe a case history of a watershed that experienced a deleterious change in flow.
Lesson 6 (Week 6)	Threats related to water quality (note this is a two-week lesson)
Topics:	Human activities that threaten water quality, and their effects on watersheds
Text Reading:	Chapter 5
Assignment:	Find a case history of a water contamination problem
Discussion:	Describe a case history of a watershed that experienced a deleterious change in water quality.
Lesson 7 (Week 7)	Case history 1: Potomac-Anacostia Watershed
Topics:	How threats from multiple sources have affected flow and quality in one watershed
Text Reading:	None
Assignment:	Read on-line references contained in the lesson
Discussion:	None
Lesson 8 (Week 8)	Watershed information
Topics:	Sources of geospatial and quantitative information needed for watershed management
Text Reading:	Chapters 6 and 7
Assignment:	Find some key information about your watershed
Discussion:	Report on the information you found.
Research & Writing Assignment:	Turn in non-technical summary of your research topic.
Lesson 9 (Week 9)	Key legislation related to watershed management

- Topics: State water laws and key Federal legislation
 Text Reading: Chapter 9
 Assignment: Find a recent or proposed law or rule pertaining to watershed management
 Discussion: Report on the recent or proposed law or rule
- Lesson 10 (Week 10) The collaborative approach to watershed management and restoration**
 Topics: Examples of multi-faceted collaborative watershed management and restoration
 Text Reading: Chapters 11 and 12
 Assignment: Read on-line references contained in the lesson
 Discussion: None
- Lesson 11 (Week 11) Urban Stormwater Management**
 Topics: Issues pertaining to watershed management in urban environments, examples of techniques to control pollution from urban stormwater.
 Assignment: Read on-line references contained in the lesson
 Discussion: Discuss application of measures to control urban stormwater pollution.
- Lesson 12 (Week 12) Case History 2: The Chesapeake Bay Watershed**
 Topics: Threats to water quality and aquatic ecology in the nation's largest estuary, and the collaborative approach to addressing them.
 Assignment: Read on-line references contained in the lesson.
 Discussion: Discuss your assessment as to the effectiveness of the Bay restoration program
- Research & Writing Assignment:** Turn in a 3-4 page (single-spaced) scholarly final paper on your research and writing topic.