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Drew Howing is Environmental Studies Program Coordinator at Iowa Lakes Community College.

Updated in 2017, this course covers an introduction to water quality analysis offered in credit programs in a face-to-face format.

Course Syllabus

Water Quality Analysis

EVS-214 (Lecture)

TBD

EVS-214B (Laboratory)

TBD

Spring 2018

**Iowa Lakes Community College
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Catalog Description: Water Quality Analysis is designed to provide the student with a basic understanding of water pollution and its impact on water quality; the physical, chemical, and biological parameters utilized to determine the quality of water; and the laboratory techniques performed to measure those water quality parameters. Topic covered will include water quality and pollution, the analysis of physical and chemical water parameters, and the analysis of biological water parameters.

Prerequisites: None

Credits: Lecture (EVS-214) – 4 credits, Laboratory (EVS-214B) – 0 credits

Text & Additional Materials: *Water and Wastewater Treatment* by Joanne Drinan and Frank Spellman and *Water Quality Analysis Laboratory Manual* by Gary Phillips

Course Objectives: The objectives of this course are to provide the student with a comprehensive knowledge and understanding of the various aspects of water quality and water pollution and the analysis of physical, chemical, and biological parameters of water.

Course Competencies: Upon completion of this course the student will be able to:

1. Describe the importance of water as a natural resource.
2. List and describe the primary sources of water pollution.
3. List and describe the major categories of water pollutants.
4. Describe the factors which cause changes in water quality.
5. List and describe the water quality standards established by federal and state water quality laws.
6. List and describe the water quality standards established for drinking water.
7. List and describe the water quality standards established for surface water resources.
8. List and describe the water quality standards established for water supply sources.
9. Describe the impacts of water pollution on flowing bodies of water.
10. Define eutrophication and describe how water pollution contributes to this process in standing bodies of water.
11. Describe the threats posed to groundwater resources by pollution sources.
12. List and describe the primary physical parameters of water.
13. Describe the concepts of chemistry that apply to the analysis of water quality.

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14. Define chemical equilibrium and describe how it applies to water resources.
15. Define the process of chemical kinetics and describe how it applies water processing and wastewater treatment.
16. Describe the concept of gas solubility and describe how it applies to water resources.
17. Define alkalinity and pH and describe how these parameters impact the quality of water.
18. Define colloids and describe how they are involved in the process of coagulation.
19. List and describe the categories of organic compounds form in water resources and describe the impact of these chemicals on water quality.
20. List and describe the primary chemical parameters of water.
21. Describe the primary gravimetric and electrometric techniques utilized to analyze water quality.
22. Describe the primary volumetric and colorimetric techniques utilized to analyze water quality.
23. Describe the primary biological techniques utilized to analyze water quality.
24. Describe the concepts of biology that apply to the analysis of water quality.
25. List and describe the characteristics of bacteria, viruses, and fungi that are encountered in the analysis of water quality.
26. List and describe the characteristics of protozoa, multicellular invertebrates, and fish that are encountered in the analysis of water quality.
27. Define the ecological concept of a food chain and describe how energy and matter is transferred in aquatic food chains.
28. List and describe the principle waterborne diseases encountered in water supplies.
29. Describe how indicator organisms are utilized in the determination of water quality.
30. Describe the techniques utilized to test for coliform bacteria in water samples.
31. Describe the techniques utilized to test for biochemical oxygen demand (BOD) in water samples.
32. Describe how biochemical treatment systems are utilized to process and treat water supplies.
33. Define the process of biological kinetics and describe how it applies water processing and wastewater treatment.

Units of Instruction:

During the semester the following units will be covered:

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1. Water quality and pollution
2. Analysis of physical and chemical water parameters
3. Analysis of biological water parameters

Methods of Instruction: Independent Study (Lecture, laboratory, on-sight, and research)

Attendance Policies: Students are expected to attend class. Attendance will be taken and used in the determination of the final course grade. Each student will begin the semester with **three** sick leave/personal days which may be used as needed by the student for any illnesses or personal matters which may arise during the semester. Once these three days have been missed, two points will be taken for every additional missed class period. Course work or exams missed on those days may be made up if done so within three class days after the absence. If more than three days are missed during the semester, make-up of course work or exams missed on those days will not be allowed. In the case of an extended illness or personal emergency, the above policies may be modified if the circumstances warrant special consideration. Days missed as a result of a school related activities (i.e. participation in course field trips, athletic events, etc.) will be considered as an excused absence only if a memo from the faculty member sponsoring the event is received by the instructor prior to the absence. If such a memo is not received, the absence will be considered as a missed class period.

Grading Policies: Grading is determined by a percentage of total points for the semester.

Scale: A = 90 to 100%
B = 80 to 89%
C = 70 to 79%
D = 60 to 69%
F = Less than 60%

Four 1-hour tests of 100 points each will be given during the semester. These tests will include multiple choice and essay questions. Four quizzes of 10 points each will also be given during the semester. These quizzes will consist of 10 multiple choice questions. Class reports and projects will be assigned during the semester and will be graded on accuracy, completeness, proper format, neatness, and scientific knowledge. A 50-point research paper will also be assigned during the semester and will be graded on the same criteria as laboratory reports.

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Tests = 400 points
Quizzes = 40 points
Worksheets = 200 points
Research Paper = 50 points
Participation = 60 points
TOTAL POINTS = 750 points

Other Expectations: Students are expected to arrive on time and have the necessary course materials and supplies required for the day's activities. The usage of cell phones by students during class is prohibited. Failure to abide with this policy may result in the ejection of the student from the classroom. Students ejected from the classroom will also forfeit one of their sick leave/personal days as a result of violation of this policy.

Important: NO food or drinks in the lab.

Students must abide by all policies as stated in the Iowa Lakes Community College Student Handbook.

Students should be aware that classes might be audio or video recorded by one or more students. The college's policies governing the audio or video recording of class are included in the Student Handbook. Students who have any questions or concerns about class recordings should address their questions or concerns with the instructor at the *beginning of the semester*.

STUDENT ACADEMIC HONESTY POLICY

Iowa Lakes Community College believes that personal integrity and academic honesty are fundamental to scholarship. Iowa Lakes strives to create an environment where the dignity of each person is recognized and an atmosphere of mutual trust exists between instructors and students. The faculty has confidence in the integrity of the students and encourages students to exercise good judgment in fulfilling this responsibility.

Actions contrary to academic integrity will not be tolerated. Activities that have the effect or intention of interfering with learning or fair evaluation of a student's work or performance are considered a breach of academic integrity. Examples of such unacceptable activities include, but are not limited to:

- **Cheating** (intentionally using or attempting to use unauthorized material, assistance or study aids in my academic work). For example, using a cheat sheet for a test, looking at another student's paper during an exam, stealing or buying all or parts of an exam or paper, altering and resubmitting work for a better grade without prior approval to do so, etc.
- **Plagiarism** (representing another's ideas, words, expressions or data in writing or presentation without giving proper credit, failing to cite a reference or failing to use proper documentation, using works of another gained over the Internet and submitted as one's own work).

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- **Falsification and/or misrepresentation of data** (submitting contrived or made-up information in any academic exercise). For example, making up data, citing non-existent sources, etc.
- **Facilitating Academic Dishonesty** (knowingly helping or attempting to help another violate any provision of the academic honesty policy). For example, working together on a take-home exam or other assignment when the option has not been made available, giving a paper/assignment to another student for his/her use, etc.
- **Multiple Submissions** (submitting, without prior approval from the instructor involved, any work submitted to fulfill academic requirements in another class). For example, submitting the same paper for two different classes, etc.
- **Unfair Advantage** (trying to gain unauthorized advantage over fellow students). For example, gaining or facilitating unauthorized access to exam materials (past or present); interfering with another student's efforts in an academic exercise; lying about the need for an extension on a paper or assignment; destroying, hiding, removing or keeping library materials, etc.

Disciplinary Action

Any violation of this policy will be treated as a serious matter. The instructor has primary responsibility over classroom behavior and maintaining academic integrity. Students who earn an "F" based on any violation of the Student Academic Honesty Policy may not withdraw from the class (and receive a grade of W). Depending on the nature and severity of the offense, Iowa Lakes Community College reserves the right to exercise disciplinary action as outlined in the Disciplinary Action Section of the Student Handbook.

Americans with Disabilities Act – Policy of Nondiscrimination

It is Iowa Lakes Community College policy to not discriminate against qualified individuals with disabilities and to provide reasonable accommodation(s), as required by law, to otherwise qualified applicants for admission or to students with disabilities in all education programs, activities, services and practices, including application procedures, admissions, course selection, the awarding of degrees, discipline and dismissal. Educational opportunities will not be denied to an otherwise qualified application or student because of the need to make reasonable accommodation(s) or modification(s) for the physical and mental impairment(s) of any such individual.

Iowa Lakes Community College students needing reasonable accommodation(s) and/or modification(s) should contact Jody Condon by phone at (712) 852-5219 or via email at jcondon@iowalakes.edu. To assure that accommodation(s) and/or modification(s) will be ready when classes start, students must make the request as soon as possible, before a semester begins.

It is the policy of Iowa Lakes Community College not to discriminate on the basis of sex, race, national origin, creed, age, marital status or disability in its education programs, activities, or employment policies, as required by Titles VI and VII of the 1964 Civil Rights Act, Title IX of the 1972 Educational Amendments, Section 504 of the Federal Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act (ADA) of 1990.

Inquiries regarding compliance with Title IX, Title VI, Title VII, or Section 504 may be directed to Kathy Muller, Human Resources, Iowa Lakes Community College, 19 S. Seventh Street, Estherville, IA 51334, telephone (712) 362-0433; to the Director of the Iowa Civil Rights Commission, Des Moines; or to the Director of the Region VII Office of Civil Rights, Department of Education, Kansas City, Missouri.

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