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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 processing offered in credit programs in a face-to-face format.

Course Syllabus

Water Processing

EVS-274 (Lecture)

TBD

EVS-274B (Laboratory)

TBD

Fall 2017

**Iowa Lakes Community College
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Catalog Description: Water Processing is designed to provide the student with a basic understanding of the characteristics of processed water, the technologies utilized to process water, the operation of water distribution and processing systems, and the laboratory techniques performed to monitor and evaluate the effectiveness of water processing. Topics covered will include water processing I, water processing II, water processing III, and water distribution and processing systems operation.

Prerequisites: None

Credits: Lecture (EVS-274) – 3 credits, Laboratory (EVS-274B) – 2 credits

Text & Additional Materials: *Water and Wastewater Treatment* by Joanne Drinan and Frank Spellman and *Water Processing 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 processing and the operation of water distribution and processing systems.

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

1. Define water processing and describe how it contributes to the health and wellbeing of humans.
2. List and describe the various sources of water used by water processing plants.
3. Describe the chemical kinetics involved in mixing chemicals with water.
4. Define flocculation and describe how it is used in the processing of water.
5. Define sedimentation and describe how it is used in the processing of water.
6. Define filtration and describe how it is used in the processing of water.
7. List the various types of water filters and describe the characteristics of each type.
8. Describe the operation and importance of chemical feeders in water processing.
9. Describe the chemistry of chlorination and the role of chlorine in the disinfecting process.
10. List the various types of chlorination systems used in water processing and the characteristics of each type.
11. Describe the processes of fluoridation and de-fluoridation.
12. Define nuisance ions and describe the impact that they have on water quality.
13. Describe the techniques used to remove iron and manganese during water processing.

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14. Define water hardness and describe the impact it has on water quality.
15. Outline the steps involved in the precipitation method of water softening.
16. Outline the steps involved in the ion exchange method of water softening.
17. Describe the techniques used for nitrate removal in water processing.
18. Describe the techniques used for the removal of turbidity in water processing.
19. Describe how taste and odor are controlled in processed water.
20. Define demineralization and describe how dissolved salts are removed in water processing.
21. Describe the techniques used to stabilize water in water processing.
22. Describe the techniques used to control corrosion by processed water in water distribution systems.
23. List the various wastes produced by water processing and describe their characteristics.
24. Describe the methods available for the disposal of water processing wastes.
25. Describe the techniques used to inspect and maintain water distribution systems.
26. Describe the techniques used for testing water distribution systems.
27. Define process control and describe how it is applied to water processing.
28. Describe the techniques used to maintain quality control in water processing.
29. Describe the techniques used to control the transfer of water in a distribution system.
30. Describe the types of records that must be maintained by a water processing facility.
31. Describe the techniques utilized in water processing to conserve water and energy.
32. Describe the factors that must be considered in setting water rates.

Units of Instruction:

During the semester the following units will be covered:

1. Water processing I
2. Water processing II
3. Water processing III
4. Water distribution and processing system operation

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

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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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