

|                      |                                |
|----------------------|--------------------------------|
| <b>Lecture</b>       | Mon/Wed 13:00-13:50 in TNR 255 |
| <b>Lab section 1</b> | Thu 12:00-13:50 in WEC 110     |
| <b>Lab section 2</b> | Thu 14:00-15:50 in WEC 110     |

|               |  |
|---------------|--|
| Instructor:   | Daniel Keymer  |
| Office:       | TNR 267  |
| Email:        | <a href="mailto:dkeymer@uwsp.edu">dkeymer@uwsp.edu</a> (preferred) |
| Phone:        | 715-346-2616   |
| Office Hours: | Mon. 2-3 PM, Tues 2-3 PM, or by appt.                              |

### **I. Course description:**

This is a course about the management of water quality through treatment. We will explore the composition of water, the ecology of receiving waters and water quality requirements for drinking and industrial uses. We will examine how these water quality requirements dictate treatment needs and the fundamentals of treatment processes for altering the quality of water. We will explore these topics in both laboratory and lecture.

### **II. Learning Objectives:**

By the end of this course, students will be able to:

1. Understand the importance of water and wastewater composition on the quality of water and its release into the environment.
2. Identify the appropriate treatment techniques for modifying water and wastewater composition and understand the fundamental principles behind the operation and design of those techniques.
3. Perform routine water quality and treatment measurements and use the results to evaluate treatment processes and prepare technical reports.

### **III. Course Format:**

This course includes two fifty-minute lectures and one two-hour lab per week. Students are expected to attend all lectures and labs. There will be in-class exercises, homework problem sets, and (hopefully) two field trips (TBD).

#### ***Attendance policy***

If you cannot attend a scheduled class session or will be excessively tardy (>5 minutes late), you must have an excused absence to be eligible for any points awarded during the missed class. Excused absences will be considered by Dr. Keymer on a case-by-case basis. It is your responsibility to contact Dr. Keymer at least one week prior to an absence if you have a scheduled conflict that cannot be moved. Illness related absences must be excused by a doctor's note. For other unforeseen circumstances resulting in a missed class, Dr. Keymer must be contacted within 36 hours to arrange for any make-up activity. For both excused and unexcused absences, the student is responsible for reviewing all covered material and announcements with Dr. Keymer or his/her classmates.

***Expectations***

My expectations for you are that you will respect others, take responsibility for your own learning, participate and ask questions, and maintain a safe working environment. All communication with instructors or classmates must be respectful in content and tone. The classroom must be an environment where everyone feels comfortable and able to learn. Accordingly, students are required to treat others with respect and any behavior that impedes the ability of other students to learn will not be tolerated. Students are expected to come prepared to class, ready to discuss assigned readings. Homework assignments will be due a week after they are assigned at the beginning of lecture. They can be handwritten and must be well organized and legible. Reports for the laboratories will be due at the beginning of the laboratory two weeks later. Laboratory reports should be typed (Laboratory Report rubric will be provided at the first laboratory). Save an electronic copy of your laboratory report so that you can reprint if necessary. Hard copies of assignments must be organized, legible, and turned in on the day they are due. Unless specified otherwise, late assignments will receive a 5% point reduction per day.

As your instructor, you can expect Dr. Keymer to do everything in his power to be fair, to be available and willing to help you, to provide feedback on work in a timely manner, to relate tasks to real-world skills, and to ask you think.

In addition to the specific expectations outlined above, all participants in the course are expected to act in accordance with the UWSP Rights and Responsibilities document. For more information, see the following link: <https://www.uwsp.edu/dos/Pages/Student-Conduct.aspx>.

***Regrade requests***

Requests for regrading any assignment or exam must be submitted to Dr. Keymer in writing within one week of the graded item being returned.

**IV. Course Requirements**

***Required textbook***

*Water and Wastewater Technology*, Seventh Edition by Hammer and Hammer, Jr. (2012) Pearson Education, Inc., Upper Saddle River, NJ.

***Supplemental materials***

Additional resources will be disseminated via Canvas. Lecture slides will be posted prior to lecture. Handouts, homework assignments, practice problems, and announcements will be made available through Canvas, email, or in class.

***Technology requirements***

Students in this course will need access to a calculator for exams and a computer with spreadsheet and word processing software for completing assignments.

***Exams***

Lecture and laboratory material will be included on two in-class exams. A cumulative final exam, although primarily focusing on material covered since the second midterm exam, will be given during the scheduled exam period (Monday, May 15<sup>th</sup> from 10:15 AM to 12:15 PM).

***Point distribution***

Student grades will be determined based on the following breakdown of points:

|               |             |
|---------------|-------------|
| Assignments   | 24%         |
| Lab reports   | 24%         |
| Exams         | 48%         |
| Participation | 4%          |
| <b>Total</b>  | <b>100%</b> |

Dr. Keymer may also offer extra credit opportunities at his discretion.

***Grading scale***

Letter grade assignments will be made according to the following scale:

|    |             |    |            |    |             |
|----|-------------|----|------------|----|-------------|
| A  | = 93 - 100% | B- | = 80 - 82% | D+ | = 67 - 69%  |
| A- | = 90 - 92%  | C+ | = 77 - 79% | D  | = 63 - 66%  |
| B+ | = 87 - 89%  | C  | = 73 - 76% | D- | = 60 - 62%  |
| B  | = 83 - 86%  | C- | = 70 - 72% | F  | = below 60% |

***Safety***

On the first day of lab, you will be provided with lab safety rules that you are expected to know and follow. This includes silencing all cell phones or other mobile devices in the lab to prevent dangerous distractions while working with hazardous materials. During lab periods, we will learn techniques that maintain a safe working environment and integrity of lab materials and equipment. Failure to abide by the safety rules and techniques communicated by Dr. Keymer will result in loss of participation points and/or removal from the lab.

**V. Academic Integrity**

All students have agreed to the UW System Code of Conduct and are expected to know and abide by the rules documented therein. The policy can be found through the Division of Student Affairs (<https://www.uwsp.edu/dos/Documents/UWS%2014-1.pdf>). This includes knowing the difference between plagiarism and paraphrasing, whether summarizing someone else's work in writing or on presentation slides. Individual student work submitted for credit will be your own and not submitted for credit in another course.

Working in groups is encouraged and allowed for homework assignments and lab reports. This does not include exams and any collaboration among students on an exam is strictly forbidden. Appropriate credit must be given to all authors of assignments submitted for credit. It is assumed that students attaching their name to a group assignment have been responsible for a substantial contribution to its completion. Dr. Keymer should be notified if you are aware of any student taking credit for someone else's work. Violation of this policy could lead to failure on the assignment/exam, failure of the course, or other disciplinary action at the University level.

**VI. Academic Accommodations**

Accommodations for students with disabilities will be made on an individualized basis. Students must register with Disability and Assistive Technology Center to identify and confirm appropriate accommodations. Dr. Keymer will be happy to accommodate, but must be notified of any documented accommodations during the first three weeks of the semester, so that satisfactory

arrangements may be provided. Please notify Dr. Keymer immediately if unusual circumstances arise during the semester that change your accommodation needs.

**VII. Anticipated Course Schedule: (Subject to change)**

| <b>Week</b> | <b>Lecture topic</b>                   | <b>Readings</b>                                     | <b>Homework</b> | <b>Laboratory topic</b>                              |
|-------------|--|---|-----------------|--|
| <b>1</b>    | Water cycle<br>Water Treatment         | Ch. 1<br>Ch. 2, 7-1, 7-16                           |                 | Introduction   |
| <b>2</b>    | Safe Drinking Water Act                | 5-1, 5-2, 5-3, 7-18                                 | HW1             | Iron oxidation                                       |
| <b>3</b>    | Coagulation<br>Flocculation            | 2-8, 7-8, 7-2                                       |                 |  |
| <b>4</b>    | Sedimentation<br>Filtration            | 7-3, 7-6<br>7-7, 7-4                                | HW2             | Coagulation and<br>flocculation                      |
| <b>5</b>    | Disinfection<br>Water softening        | 7-12, 7-13, 7-14, 7-15<br>7-17, 2-7, 7-21, 7-22     |                 |  |
| <b>6</b>    | <b>Exam 1 (3/01)</b>                   |   |                 | Field trip   |
| <b>7</b>    | Hydraulics<br>Valves, Pumps            | 4-1, 4-2, 4-3, 4-8, 4-9<br>4-10, 6-8, 6-9, 4-4, 4-5 | HW3             | Pump analysis and<br>hydraulics                      |
| <b>8</b>    | Distribution systems                   | 6-1, 6-5, 6-6, 6-7                                  |                 |  |
| <b>9</b>    | NO CLASS                               |   |                 | NO LAB   |
| <b>10</b>   | Clean water act                        | 5-6, 5-4, 5-5                                       | HW4             | Oxygen transfer                                      |
| <b>11</b>   | Wastewater collection and<br>treatment | 10-2, 10-4, 10-6, 10-8<br>9-1, 9-2, 9-3, 9-4, 2-6   |                 |  |
| <b>12</b>   | <b>Exam 2 (4/12)</b>                   | 2-11, 3-10  |                 | Biochemical oxygen<br>demand and<br>suspended solids |
| <b>13</b>   | Primary & Secondary Treatment          | 11-1, 11-2, 11-4<br>2-10, 3-11, 3-12                | HW5             |  |
| <b>14</b>   | Activated sludge                       | 11-6  |                 | Activated sludge                                     |
| <b>15</b>   | Attached growth systems                | 11-5  | HW6             |  |
| <b>16</b>   | Biosolids                              | 11-11, 11-13, 11-14<br>11-15, 11-16, 11-17<br>11-18 |                 | Field trip   |
| <b>17</b>   | <b>Final exam (5/15)</b>               |   |                 |  |