CE 771
Spring 2016
Physical-Chemical Water Treatment Processes
406 Mann Hall, M W F 8:30 – 9:20

Detlef Knappe
319-E Mann Hall
515-8791 (office)
knappe@ncsu.edu

Office Hours: M W F directly after class. For EOL students, the best way to reach me is via e-mail. Be sure to put “CE771” in the subject heading so that I will know that the message is about the course. If you need to discuss something with me by telephone, please e-mail me so we can arrange a convenient time for a phone call. I do not check voicemail as frequently as e-mail, so e-mail is the preferred method of communication.

Course Objectives

At the end of this course you should be able to apply physicochemical principles of environmental engineering to the design of the most common unit processes used in the treatment of water and waste. Furthermore, you should be able to select and design appropriate unit processes for scenarios typically encountered in the area of drinking water treatment.

Course Schedule

<table>
<thead>
<tr>
<th>Topic</th>
<th>Tentative Dates</th>
<th>Text Chapter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality and Treatment Objectives</td>
<td>Jan. 6 - 11 (3 lectures)</td>
<td>1-3, handouts</td>
</tr>
<tr>
<td>Hydraulic Characteristics of Reactors</td>
<td>Jan. 13 - 27 (6 lectures)</td>
<td>4</td>
</tr>
<tr>
<td>MLK Day (no class)</td>
<td>Jan. 18</td>
<td></td>
</tr>
<tr>
<td>Coagulation and Flocculation</td>
<td>Jan. 29 – Feb. 5 (4 lectures)</td>
<td>8</td>
</tr>
<tr>
<td>Sedimentation and Flotation</td>
<td>Feb. 8 - 12 (3 lectures)</td>
<td>9</td>
</tr>
<tr>
<td>Filtration</td>
<td>Feb. 15 - 22 (4 lectures)</td>
<td>10</td>
</tr>
<tr>
<td>FIRST EXAM</td>
<td>Feb. 24</td>
<td></td>
</tr>
<tr>
<td>Chemical Oxidation</td>
<td>Feb. 26 – Mar. 16 (6 lectures)</td>
<td>7, 19</td>
</tr>
<tr>
<td>Spring Break (no class)</td>
<td>Mar. 7 - 11</td>
<td></td>
</tr>
<tr>
<td>Disinfection</td>
<td>Mar. 18 - 28 (4 lectures)</td>
<td>17, 18</td>
</tr>
<tr>
<td>Spring Holiday (no class)</td>
<td>Mar. 25</td>
<td></td>
</tr>
</tbody>
</table>
Adsorption

SECOND HOUR EXAM  Apr. 8

WTP FIELD TRIP (tentative)  Apr. 8 (leaving campus ~12:30)

Softening, Water Stability, Corrosion  Apr. 11 - 15 (3 lectures)  13
Membrane Treatment Processes  Apr. 18 - 20 (2 lectures)  11
Gas Transfer Processes  Apr. 22 - 25 (2 lectures)  6

FINAL EXAM  Friday, Apr. 29, 8:00 - 11:00 a.m.

Course Web Page (contains syllabus, homework assignments, lecture handouts, and useful links) [http://courses.ncsu.edu/ce771/](http://courses.ncsu.edu/ce771/). Videos of lectures can be found at [http://engineeringonline.ncsu.edu/mediasite/Homepages_Video/ce771_lectures.html](http://engineeringonline.ncsu.edu/mediasite/Homepages_Video/ce771_lectures.html)

Course Text


Recommended References


---

**CE 771 Course Policies**

**PREREQUISITES, COREQUISITES**

CE 574 (prerequisite), CE 571 (corequisite)

**GRADING:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hour Exams</td>
<td>22.5%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td>Homework</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Students wishing to audit the course must meet with the instructor to develop requirements for a grade of S (satisfactory).
PROCEDURES

1. There will be two exams throughout the semester and one comprehensive final exam. The first two exams will be closed book/closed notes except for one (1) 8.5”x11” sheet of notes (front and back). The final will be given during the regularly scheduled exam period and will be closed book/closed notes except for two (2) 8.5”x11” sheets of notes (front and back).

2. For on-campus students, homework will be due at the beginning of the class period on the assigned due date. Off-campus students need to send homework as a pdf document to homework_eol@ncsu.edu by noon on the assigned due date.

3. Homework Policy: The homework assignments are critical to your learning the material and 80% of homeworks must be turned in to receive a grade other than F for the class. You are strongly encouraged to work in groups of 2 to turn in one joint assignment with the names of both contributors. Although homework must be turned in on time, homework will not be graded beyond a quick check to be certain that you are doing the problems. Satisfactory completion of all regularly assigned homework will constitute 15% of your grade. Homework solutions will be available electronically on receipt of each assignment. There will be 1 to 2 homework assignments that will be graded.

4. Format for Homework Assignments
   - Homework must be turned in on engineering paper or printed on white paper when you are submitting spreadsheet results. Writing on both sides of the paper is acceptable.
   - All students’ names should be in the upper right hand corner of the first page. The homework assignment number should be on the next line.
   - Homework pages should be stapled together and should not be folded or paper clipped. Do not fold the assignment in half.
   - Do not use a cover sheet.
   - Homework must be neatly written with answers underlined or in a box.
   - Problems solutions should be presented in the order in which they are assigned with the problem number clearly labeled at the top of the solution and again if the solution extends to a second page. Work must be presented so that it is possible to understand the solution.
   - Results in all steps of a solution need to have units.

5. Tests and assignments missed without an approved excuse will be dealt with individually. If a student misses his/her final exam without a valid excuse, a zero will be averaged into his/her grade. See http://policies.ncsu.edu/regulation/reg-02-20-03 for a detailed description of the University’s attendance regulations.

ACADEMIC INTEGRITY STATEMENT

Students are expected to adhere to the guidelines for academic integrity as outlined in the NC State University Code of Student Conduct. Cheating and plagiarism will result in loss of credit for the test or assignment in question. See http://policies.ncsu.edu/policy/pol-11-35-01 for a detailed description of the Code of Student Conduct.

STUDENTS WITH DISABILITIES

Reasonable accommodations will be made for students with documented disabilities. In order to take advantage of available accommodations, students must register with Disability Services Office (see http://dso.dasa.ncsu.edu/).