**CEGR 4242/5090 Wastewater Treatment Plant Design**

**Lectures:** Tuesdays and Thursdays 11:00 a.m. -12:15 p.m. Duke 208

**Instructor:** Dr. Olya Keen

Office hours: Mondays and Wednesdays 10:00 a.m.-12:00 p.m., EPIC 3171

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**Textbook:** Wastewater Engineering, Treatment and Reuse, Metcalf&Eddy, 5th ed.

ISBN-13: 9780073401188

**Topics to be covered:**

1. Basics and terminology
2. Regulations: past, present, future
3. Wastewater constituents and measurements
4. Overview of mass balances, process design and reaction kinetics
5. Pretreatment processes
6. Biological treatment
   1. Suspended growth modeling and aerobic treatment
   2. Suspended growth with nitrification
   3. Biological nutrient removal
   4. Anaerobic processes
   5. Attached growth
7. Solids processing
8. Disinfection
9. Hydraulic profile
10. BioWin wastewater modeling software
11. Budgeting and cost estimation
12. Advanced treatment processes and water reuse

**Attendance:**

Attendance is not mandatory in this class and will not be checked. However, it is in your best interests to attend. I use blackboard for teaching, so you would have to count on your friends to take good notes or learn the material on your own, if you choose to skip classes.

**Grading:**

The overall grade will not be curved, although grades for individual assignments might. Note that there is no D grade for grad students.

A: 90.0-100%

B: 80.0-89.9%

C: 70.0-79.9%

D: 60.0-69.9%

F: < 60.0%

**Grade distribution:**

|  |  |  |
| --- | --- | --- |
| Item | Undergraduate | Graduate |
| Homework | 25% | 25% |
| Exam 1 | 15% | 15% |
| Exam 2 | 15% | 15% |
| Exam 3 | 15% | 15% |
| Treatment plant design group report | 15% | 10% |
| Wastewater relevant research topic report | N/A | 10% |
| Design group presentation | 15% | 10% |

**Homework:**

Homework assignments will be distributed at the beginning of the new topic and will be due a week from the distribution date (e.g. if it was distributed at the beginning of class Tuesday Sept 3rd, it will be due at the beginning of class Tuesday Sept 10th). Late homework is only accepted with a documentable reason and until the graded homework is returned. Graduate students will have additional, more in-depth and often qualitative questions on each homework. Students may discuss the homework with each other, but each student must perform his/her own calculations individually. Copying someone else’s work will be considered cheating and will be addressed per UNCC standard procedures.

Your homework must be in neat, legible handwriting, with the problems in the same order as they are listed on the assignment, and stapled. I reserve the right to take off points from homework submissions that do not adhere to these standards. All calculations must be shown for partial credit.

**Exams:**

Exams will consist of multiple choice, short answer and quantitative problems. A review session will precede each exam. Exams will be in-class and will be closed books and notes. All calculations must be shown for partial credit.

**Field trip:**

Field trip may be taken during this class, but will not be mandatory. Towards the end of the semester when you know more about design, I would like everyone to see a full-scale wastewater treatment plant. Details TBD.

**Group work and design presentation:**

Group work is part of life, so it will be part of the class as well. I will do my best to make it as painless and conflict-free as possible. I would like each group to have at least 1 grad student it in for leadership and guidance. Each group will consist of 3-4 people so the responsibilities can be split. The team members will evaluate the contribution by the other team members, so people who do not carry their part of the load will receive lower grade. For the project, you will design a wastewater treatment plant given the problem statement that will come from the WEFTEC student design competition. The deliverables are a technical report and an in-class 30 min presentation with 5 min for questions. Good technical questions to opposing teams will be expected and will be factored into the grade. The guidelines for the report will be distributed with the project announcement later in the semester.

This group project presentation will take place during the final exam time slot and will be considered a final examination for this class. The best team will be competing at the state level for a chance to attend the national competition at WEFTEC conference September 26-30th, 2015, in Chicago, IL. Judges from engineering consulting will be attend your presentations and will help throughout the semester in your design preparation.

**Research report:**

Graduate students will have an additional deliverable in this class. They will be required to write a 4-6 page report (single space) on a wastewater relevant topic of their choosing. The topic will need to be approved by me. It may be relevant to your research but cannot match it exactly. The report will be due sometime mid-semester, and the exact date will be announced later.

**Student Conduct & Academic Integrity Policy:**

You are expected to attend all lectures and will be responsible for all material presented in class. You are encouraged to work together and discuss homework problems. However, copying another student’s work, solutions manual or information from references, internet sources or other information is strictly forbidden and will constitute a violation of the UNC Charlotte Code of Student Academic Integrity.

Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the instructor who is responsible for dealing with them. Students have the responsibility to know and observe the requirements of the UNCC Code of Student Academic Integrity which is available from the Dean of Students Office or online at: <http://legal.uncc.edu/policies/up-407>. This code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonestly. Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.  ***All acts of academic dishonesty will be reported to the Dean of Students Office and the settlement procedure outlined in the Code will be initiated. First offenses will result in a formal warning, an F on the assignment, and at least one letter grade reduction in the final course grade (after the failed assignment has been factored in) based on the nature of the offense.*** Whatever the penalty, a form that has been signed by both the student and the instructor recording the settlement will be kept for eight years in the Office of the Dean of Students.