

Course #: M1586.0012  
1<sup>st</sup> Semester of 2019  
**Advanced Water Quality**  
Professor Jong Kwon Choe

**Class:** M & W 9:30 am – 10:45 am at Building 35 Room 432

**Office Hours:** M 10:45 am – 11:50 am at Room 402 (Other times by appointment)

**Course Objectives:**

1. To provide the student with a fundamental and applied science and engineering principles dealing with natural and engineered water systems
2. To identify key interactions that govern water characteristics
3. To explore emerging constituents that affect water quality

**Prerequisite:**

Recommended to have basic understanding of algebra, calculus and chemical principles

**Textbook:**

1. Water Chemistry 2<sup>nd</sup> Edition by M. Benjamin
2. Water Chemistry by P. Brezonik, W. Arnold

**Course Grading:**

Attendance / Participation:	10%
Homework (to be completed individually):	20%
Midterm Exam:	25%
Final Exam:	30%
Research paper	15%

**Lecture:**

Lecture materials will be uploaded in ETL website (<http://etl.snu.ac.kr>) prior to the class. There will often be in-class activities, so bring an engineering calculator to the class.

**Homework:**

Homework assignments are due at the beginning of class for the assigned date. Assignments turned in after the class will receive 20% penalty, and additional 20% will be deducted for each day. You may study with others, but the preparation and submission of homework is an individual effort.

**Exams:**

There will be one midterm exams (April 24<sup>th</sup>) and one final exam (June 12<sup>th</sup>). Exams are CLOSED BOOK unless otherwise noted.

**Written Paper:**

Each student will prepare a research paper on emerging contaminants in water and give a presentation. More detail will be provided later in the semester.

**Academic Honesty:**

Plagiarism or cheating (intentional or unintentional) will result in strict penalties. Each student must abide to the highest standards of professional ethics and honesty.

**Class Participation:**

Each student needs to come to class prepared by studying assigned readings according to the schedule. Excused absence must be notified and approved in advance.

**Tentative Lecture Plan:**

- I. Introduction to water quality & chemistry
- II. Water constituents reaction models and thermodynamics principles
- III. Reaction kinetics & models
- IV. Acid base chemistry
- V. Software for calculating aqueous chemical equilibria
- VI. Aqueous-Gas Equilibria
- VII. Alkalinity
- VIII. Coordination chemistry of metal complexes
- IX. Metal precipitation
- X. Basic organic chemistry
- XI. Adsorption
- XII. Redox chemistry
- XIII. Emerging water contaminants (presentations)