



## Environmental Engineering

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|------------------------------|-----------------------------------|----------------------|------------------|
| <b>Course Code</b>           | 457.210A (College of Engineering) |                      |                  |
| <b>Class Times</b>           | Mon/Wed/Thu<br>13:00-16:00        | <b>Classroom</b>     | TBA              |
| <b>Equivalent Year Level</b> | 2                                 | <b>Course Credit</b> | 3                |
| <b>Instructor I</b>          | Jong Kwon Choe                    | <b>Sessions</b>      | 1-14             |
| <b>Office</b>                | Bld.35, Rm. 402                   | <b>Email</b>         | jkchoe@snu.ac.kr |

### □ Instructor's Profile (Sessions 1-14)



#### **Jong Kwon Choe**

Assistant Professor, Department of Civil and Environmental Engineering, Seoul National University

Jong Kwon Choe has worked as an assistant professor in the Department of Civil and Environmental Engineering at Seoul National University since Fall 2016. Prior to joining SNU, he worked as a post-doctoral research fellow at Stanford University and as an assistant professor at Clarkson University in the U.S. He majors in environmental engineering with a specific interest in water and wastewater treatment technologies, application of green chemistry, sustainability analysis, and synthesis and characterization of advanced materials for environmental application. In addition to the undergraduate class of [Environmental Engineering], he teaches [Physicochemical Processes in Environmental Engineering] and [Advanced Water Quality] courses for graduate students.

#### **Education**

Ph.D., Dept. of Civil and Environmental Engineering, University of Illinois at Urbana Champaign

M.S., Dept. of Civil and Environmental Engineering, University of Illinois at Urbana Champaign

B.S., Dept. of Civil Engineering, The Cooper Union for Advancement of Science and Art

#### **Expertise**

Water treatment technologies, catalysis, life cycle assessment, x-ray spectroscopic characterization

#### **Most Recent Works**

“A New Bioinspired Perchlorate Reduction Catalyst with Significantly Enhanced Stability via Rational Tuning of Rhenium Coordination Chemistry and Heterogeneous Reaction Pathway” *Environmental Science & Technology*, Vol. 50, 5874-5881.

“Evaluation of a Hybrid Ion Exchange-Catalyst Treatment Technology for Nitrate Removal from Drinking Water” *Water Research*, Vol 96, 177-187.

“Degradation of Amino Acids and Secondary Structure in Model Proteins and Bacteriophage MS2 by Chlorine, Bromine and Ozone” *Environmental Science & Technology*, Vol 49, 13331-13339



## □ Course Information

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| Course Description        | This course is an introductory class of environmental engineering designed for benefit of any students at college level. For those who seeks for environmental engineering as a major, the class will help build up general background on the subject for future in-depth study. For others, the class will provide college-level knowledge to help understand environmental issues in everyday life. Beginning with an introduction of chemistry and biology background useful to understand environmental processes and environmental engineering practices, the class will discuss causes, effects, and monitoring of environmental concerns, and engineering solutions for the concerns. The class encompasses most of the sub-topics of environmental engineering including water quality and quantity, air quality, solid and hazardous waste management, and noise pollution. |
| Course Evaluation         | Class participation 30%<br>Midterm exam 35%<br>Final exam 35%<br><br><b>Attendance</b> will be important for keeping up with class. Good attendance and <b>active participation</b> will be reflected in grade.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Course Materials          | Hand-outs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Class Policy              | Plagiarism is strictly prohibited.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Etc.<br>(e.g. Guidelines) | Please be advised that questions for mid-term and final exam will be based on lecture given in class, not text book.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## □ Course Schedule

\* The class will be run with hand-outs only, which is designed to be stand-alone. In other words, students will be able to understand the class topics without the help of any texts other than the hand-outs. However, those who want supplementary readings may obtain the textbook “Davis, M. L. and Masten, S. J. (2014) Principles of Environmental Engineering and Science, 3<sup>rd</sup> ed., McGraw-Hill.” The hand-outs are organized and written based on the textbook.

### Session 1 (Jun. 27, Wed)

- Topic 1: Introduction to environmental engineering
- Topic 2: Basic chemistry concepts (1)

Supplementary reading: Textbook Ch. 2

### Session 2 (Jun. 28, Thu)

- Topic 1: Basic chemistry concepts (2)
- Topic 2: Basic biology concepts

Supplementary reading: Textbook Ch. 2, 3

### Session 3 (Jul. 2, Mon)



- Topic 1: Mass balance
- Topic 2: Reactor analysis

Supplementary reading: Textbook Ch. 4

**Session 4 (Jul. 4, Wed)**

- Topic 1: Ecosystem
- Topic 2: Risk perception, assessment, and management

Supplementary reading: Textbook Ch. 5, 6

**Session 5 (Jul. 5, Thu)**

- Topic: Hydrology

Supplementary reading: Textbook Ch. 7

**Session 6 (Jul. 09, Mon)**

- Topic: Water quality

Supplementary reading: Textbook Ch. 9

**Session 7 (Jul. 11, Wed) – *Mid-term Exam***

**Session 8 (Jul. 12, Thu)**

- Topic: Water treatment

Supplementary reading: Textbook Ch. 10

**Session 9 (Jul. 16, Mon)**

- Topic: Wastewater treatment

Supplementary reading: Textbook Ch. 11

**Session 10 (Jul. 18, Wed)**

- Topic: Air pollution

Supplementary reading: Textbook Ch. 12

**Session 11 (Jul. 19, Thu)**

- Topic 1: Solid waste management
- Topic 2: Hazardous waste management

Supplementary reading: Textbook Ch. 13, 14

**Session 12 (Jul. 23, Mon)**

- Topic 1: Noise pollution

Supplementary reading: Textbook Ch. 15

**Session 13 (Jul. 25, Wed)**

- Topic 1: Sustainability

Supplementary reading: Textbook Ch. 8

**Session 14 (Jul. 26, Thu)**

- Topic 1: Current issues and future perspectives
- Topic 2: Discussion on current environmental issues

\* Each student should bring news articles, etc. of an environmental issue that brought public



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interest in his/her own country and give a brief oral introduction to promote discussion.

**Session 15 (Jul. 27, Fri) – *Final Exam***