| | |
|---|---|
| * Course Keywords | Water quality, Water pollution, Sewage, Wastewater, Wastewater treatment, Water management, Water cycle, Sustainability |
| * 1. Purpose of Course | This class deals with the engineering methodologies to protect the human and ecosystem health from the threat of water pollution caused by human activities. Students study collection, transport, treatment, and discharge of wastewater and stormwater as well as the approaches to enhance the sustainability of human water use by recovering energy and resources from wastewater and stormwater. Based on engineering principles, the planning, design, operation, and maintenance of unit processes involved in the treatment of and energy/resource recovery from wastewater, stormwater, and residual solids are studied. Novel technologies for sustainable water use through energy and resource recovery are reviewed, and challenges and future tasks involved in the enhancement of water use sustainability are discussed. |
| * 2. Materials and Reference | Teaching Materials: handout (powerpoint slides, journal and news articles, etc.)<br>Reference: Metcalf & Eddy, AECOM. Wastewater Engineering: Treatment and Reuse, 5th ed., McGraw-Hill, 2015. |

*** 3. Evaluation Method**

**Evaluation:** Absolute Evaluation

**Grading Type:** A~F

| Evaluation Items | Attendance | Assignment | Quiz | Final | Team project | Total |
|---|---|---|---|---|---|---|
| Rate | 10 | 20 | 10 | 30 | 30 | 100% |
| **Note** | 1 absence = 25% loss in credit | | 10-min online quiz at the beginning of each class | | Each team selects a particular type of contaminated source water and propose a sustainable maintenance system for safe discharge of the water. Team presentation will be given on the last day of the course. | |

**Attendance Policy :** Students who are absent for over 1/3 of the class will receive a grade of 'F' or 'U' for the course(Exceptions can be made when the cause of absence is deemed unavoidable by the course instructor).

**Other:**

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| * 4. Quota Exceeding Course Registration | **Capacity:** None |
| 5. Guideline for Students | Prerequisite course: Environmental Engineering<br>Office Hours and Place: By appointment; Bldg. 35, Rm. 307 |

*** 6. Lecture Plan**

**Teaching Method** Flipped learning

Regular lecture will be given in a videotaped form. Class times will be utilized for quiz taking and solutions. Also done in the class times include discussion on current issues and introduction of recent research progresses regarding water quality, and laboratory tours.

**Class Schedule :**

| Week | Topics and Contents | Lecture Method | Teaching Material | Assignments |
|---|---|---|---|---|
| 1 | Class intro, water quality basics | Zoom+Video lecture | handout | - |
| 2 | Water characteristics: physical | Zoom+Video lecture | handout | - |
| 3 | Water characteristics: chemical | Zoom+Video lecture | handout | HW#1 out |
| 4 | Water characteristics: biological | Zoom+Video lecture | handout | HW#1 in |
| 5 | Water quality: current issue & research | Zoom | handout | - |
| 6 | Wastewater management & treatment | Zoom+Video lecture | handout | HW#2 out |
| 7 | Reaction & reactor analysis | Zoom+Video lecture | handout | HW#2 in |

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|---|---|---|---|---|---|
| | 8 | Physical unit processes | Zoom+Video lecture | handout | HW#3 out |
| | 9 | Physical unit processes(+current research) | Zoom+Video lecture | handout | HW#3 in |
| | 10 | Chemical unit processes(+current research) | Zoom+Video lecture | handout | HW#4 out |
| | 11 | Biological unit processes: fundamentals | Zoom+Video lecture | handout | HW#4 in |
| | 12 | Biological unit processes: practicies | Zoom+Video lecture | handout | - |
| | 13 | Water-energy nexus & decentralized systems | Zoom+Video lecture | handout | HW#5 out |
| | 14 | Final exam & Lab tour | Offline | - | HW#5 in |
| | 15 | Team project: Discussion & presentation | Zoom | - | - |
| **7. Support Services for Students with Disabilities**<br><br>※ You can modify these default contents. | For Lectures | ○ Visual Impairment: Make textbooks(digital textbook, braille textbook, enlarged textbook etc.), Allow note takers<br>○ Physical Disability: Make textbooks(digital textbook), Allow note takers and assistants<br>○ Hearing Impairment: Allow note takers and translators, Allow lecture recording<br>○ Health Impairment: Excuse absence due to health problems, Allow note takers<br>○ Learning Disability: Allow note takers<br>○ Intellectual Disability / Autism Spectrum Disorder: Allow note takers and mentors | | | |
| | For Assignments & Evaluations | ○ Visual Impairment / Physical Disability / Hearing Impairment / Health Impairment / Learning Disability: Extend assignment deadlines, Offer alternate assignment submission and response method, Extend testing period, Offer alternate testing method, Offer different testing room<br>○ Intellectual Disability / Autism Spectrum Disorder: Offer individualized assignments and alternative evaluations | | | |
| | Other | Students who take this course can get appropriate level of support service including the support listed above depending on the students' individual characteristics and needs through consultation with professors and the Support Center for Students with Disabilities. If you have any questions concerning support service for students with disabilities you can contact Professor Choi (02-880-7376) or Support Center for Students with Disabilities (02-880-8787). | | | |