## EVT 170 Water and Wastewater Treatment and Analysis

**Course Description:** A course on scientific and engineering principles for water quality control. Topics include: environmental microbiology; bioremediation; microbes as indicators of pollution; and physical, chemical, and biological analysis.

**Prerequisites(s):** EVS 110, and CHE 110 or CHE 121 or CHE 131

**Corequisite(s):** No corequisite

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| Lecture Hours: 3 | Lab Hours: 3 | Credit Hours: 4 |
| Lab Fee: 105 | Supplemental Fee: 0 | Purpose: |
| ☐ Transfer Assurance Guide Course (TAG) | ☐ Transfer Module Course (TM) | |
| Course Format: Lec/Lab | Grading: A/B/C/D/F/I | |
| Delivery Method: □ Web | □ Hybrid | x□ Classroom |
| Semesters Offered: x□ Fall | □x Spring | □ Summer |

**Course Primary Text:**

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| Title: Unit Operations & Processes in Environmental Engineering, | Edition: 2nd |
| Author(s): Tom Reynolds and Paul Richards | |
| Publisher: CENGAGE Learning | |

**Supplemental Materials:**

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| Handouts, lab coats, safety glasses; lab notebook/binder |
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**Course Outcomes:**

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| 1 | a. An ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;<br>b. An ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge;<br>c. An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments;<br>d. An ability to function effectively as a member of a technical team;<br>e. An ability to identify, analyze, and solve narrowly defined engineering technology problems; |

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| | f. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;<br>g. An understanding of the need for and an ability to engage in self-directed continuing professional development;<br>h. An understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity; and<br>i. A commitment to quality, timeliness, and continuous improvement. |

**Course Topics:**

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| Week 1 | Introduction<br>ASCE Competition<br><br>Physical Characteristics of Water<br>Color/Odor | | Chapter 1<br><br><br>Chapter 2 |
| Week 2 | Physical Characteristics (continued)<br><br><br><br>Characteristics | | Chapter 2<br>Jar Test<br>(Turbidity<br>Removal)Chemical |
| Week 3 | Chemical Characteristics (continued)<br><br>Water Quality Standards | | <br>Alkalinity<br>Chapter 5 |
| Week 4 | CWA/Pretreatment Program<br>Drinking Water Regulations<br>**Exam** | Chlorine Analysis | |
| Week 5 | BOD/COD<br><br>BOD/COD (continued) | BOD/COD lab | Chapter 3 |
| Week 6 | Water Processing<br><br>TOC Demo/Discussion | Finish BOD | Chapter 7 |
| Week 7 | Wastewater Flow & Characteristics<br>Wastewater Collection | | Chapter 9<br>Chapter 10<br>Solids<br>Determinations |

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| | Wastewater Processing<br>Sludge Processing | | Chapter 11 |
| Week 8 | **Exam**<br>Introduction to microbiology<br>Prokaryotic Cells<br><br>Eukaryotic Cells | Microscope<br>Prepared Slides<br><br>Mitosis Slides | Chapter 3 |
| Week 9 | Aseptic techniques<br>Isolation of pure colonies | Streak Plates<br>Gram Staining | |
| Week 10 | Bacterial Media | Selective & Differential<br>Endotube demonstrations | Handouts<br>Media |
| Week 11 | Algae, Protozoa<br>Fungi, Viruses | Dilutions & Pipettes | |
| Week 12 | Water Microbes<br>Guest Lecture: Cryptosporidium<br>**Exam** | Membrane filtration for TC | Handouts |
| Week 13 | Microbial Growth<br>Biotechnology, Protein Synthesis | Andersen Air Samplers<br>Microbial Metabolism | Handouts<br>Colilert Test<br>Handouts |
| Week 14 | Wastewater Biological Treatment systems<br>Activated Sludge Microscopic analysis | | Handouts |
| Week 15 | **Final Exam**<br>**Lab Practical** | | |

**Methods of Evaluation/Assessment**

□ Formative: □ Summative

List assessment activities (e.g. quizzes, discussions, essays, research papers, debates, oral presentations, exams):

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| Lab reports |
| homework |
| exams |
| Lab practical |
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Course Keeper: Dr. Ann Gunkel Date Completed: 4/16/19