

I. COURSE DESCRIPTION:

To present basic knowledge and practices, theories, and application relevant to wastewater flows and characteristics, treatment processes, and plant operations. Basic concepts in wastewater treatment as applied to municipal and compatible industrial environmental systems are discussed.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Assess and evaluate wastewater flows and characteristics.

Potential Elements of the Performance:

- List the physical and chemical characteristics of sewage water
- Compare primary and secondary treatment
- Calculate BOD and solids removals
- Manually prepare a composite sample

2. Perform basic design calculations of primary treatment processes.

Potential Elements of the Performance:

- Name of the devices used in preliminary and primary treatment
- Calculate hydraulic loading on a clarifier
- Differentiate between the settling characteristics of primary and secondary clarification
- Estimate the quantity of sludge produced

3. Operate and trouble shoot an activated sludge process

Potential Elements of the Performance:

- Name the components of a biological process
- Understand the biology of activated sludge process
- Calculate F/M ratio and SRT sludge age (SRT)
- Perform process control tests including oxygen uptake and settleability tests
- Calculate the oxygen transfer efficiency

4. Operation of stabilization ponds and fixed growth biological systems

Potential Elements of the Performance:

- Describe various types of stabilization ponds
 - Name the main components of a trickling filter system and a RBC system
 - Describe common operating problems
 - Calculate the loading, storage time available and expected removal efficiencies
 - Describe the working principle of household septic units
5. Diagnose the operating problems related to the operation and control of the activated sludge process.

Potential Elements of the Performance:

- Differentiate between cause and system
- List steps for troubleshooting
- Describe the various process control tests
- Describe various situations causing a process upset

III. TOPICS:

1. Wastewater Flow and Characteristics
2. Preliminary and Primary Treatment
3. Activated Sludge Process (ASP)
4. Other Biological Systems
5. Operation of Treatment Plants

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Water and Wastewater - Technology by Mark J. Hammer and Hammer Junior, Prentice Hall, 6th edition, 2008
Course Manual - by S. Verma, ETS, April, 2008

V. EVALUATION PROCESS/GRADING SYSTEM:

Final mark in the course will be based on:

| | | |
|-----------------|---|-----|
| Laboratory Work | - | 25% |
| Home work/Quiz | - | 25% |
| Tests | - | 50% |

A passing grade will be based on a composite grading of 50%.

The following semester grades will be assigned to students in postsecondary courses:

| <u>Grade</u> | <u>Definition</u> | <u>Grade Point Equivalent</u> |
|--------------|--|-------------------------------|
| A+ | 90 - 100% | 4.00 |
| A | 80 - 89% | 4.00 |
| B | 70 - 79% | 3.00 |
| C | 60 - 69% | 2.00 |
| D | 50 - 59% | 1.00 |
| F (Fail) | 49% and below | 0.00 |
| CR (Credit) | Credit for diploma requirements has been awarded. | |
| S | Satisfactory achievement in field /clinical placement or non-graded subject area. | |
| U | Unsatisfactory achievement in field/clinical placement or non-graded subject area. | |
| X | A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. | |
| NR | Grade not reported to Registrar's office. | |
| W | Student has withdrawn from the course without academic penalty. | |

VI. SPECIAL NOTES:Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources. Substitute course information is available in the Registrar's office.

Assignments/Laboratory Work:

Home assignments are due one week after they are assigned. Late submissions will be penalized. Laboratory work is an important component of this course. Performing laboratory experiments will reinforce the concepts discussed in the theory class. If required, changes will be made. However, students will be notified prior to any changes.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.