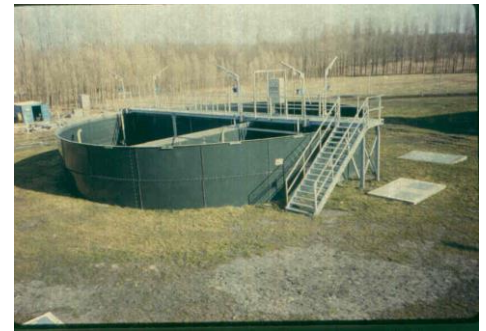## CE 5220: Water Pollution Control Processes

Course Description:

Fundamentals of biochemical processes, aerobic growth in a single CSTR, multiple events in complex systems, and techniques for evaluating kinetic parameters; unit processes of activated sludge systems, attached growth systems, stabilization and aerated lagoon systems, biosolids digestion and disposal, nutrient removal, and anaerobic treatment systems.

Course objectives (course designed to teach students to):

- Become familiar with the various water pollution control processes used in industry.
- Study the role and fundamentals of biochemical operations in water pollution control.
- Become knowledgeable of the traditional and lysis-regrowth models for simulating biochemical operations.
- Gain an understanding of and gain proficiency in using the computer simulation tool BioWin.

Course Outcomes (students should be able to):

- Apply the knowledge of biochemical operations used in water pollution control processes to develop a specific reactor system and treatment objectives.
- Write the stoichiometric equations for the main biochemical operations with various electron donors and acceptors.
- Write the Monod and Andrews kinetic expressions and explain why they are important.
- Estimate the performance of a continuous stirred tank reactor (CSTR) for given influent characteristics and detention times, when provided the stoichiometric and kinetic values.

Course Outcomes, continued

- Articulate why various bioreactor configurations with multiple bioreactors behave differently than a single CSTR.
- Simulate the performance of a bioreactor configuration using BioWin and design a system to meet certain effluent requirements.