Department of Civil and Environmental Engineering
School of Mining and Petroleum Engineering

CIV E 623 – Industrial Water and Wastewater Management

INSTRUCTOR

Yaman Boluk, PhD, PEng

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OFFICE HOURS *(tentative)*

Wednesday (2:00 PM to 3:00 PM)

DICE 7-273

LECTURE TIME & LOCATION

Tuesday (2:00 PM to 4:50 PM)

NRE 2-080

GRADE DISTRIBUTION

Final Examination	50 %
Mid-Term Examination	30 %
Assignments (4 *in total)*	20 %

RECOMMENDED TEXTBOOKS

Metcalf & Eddy / AECOM — Wastewater Engineering: Treatment and Resource Recovery, latest edition

COURSE DESCRIPTION

This graduate course examines the sources, characteristics, and management of industrial water use and wastewater generation, with emphasis on treatment technologies, regulatory compliance, water reuse, and sustainable resource recovery. Students will study fundamental treatment principles alongside sector-specific case studies relevant to Alberta and Canadian industry, including energy, forestry, food processing, and mining.

LEARNING OUTCOMES

- Characterize industrial water and wastewater streams using standard physical, chemical, and biological parameters.
- Perform industrial water balances and identify water minimization, reuse, and recycling opportunities.
- Evaluate and design physical, chemical, and biological treatment processes for industrial effluents.
- Analyze sector-specific water and wastewater management challenges relevant to Alberta industry.
- Assess emerging treatment technologies, resource recovery strategies, and regulatory requirements.

ASSIGNMENTS

- Assignments are to be uploaded to Dropbox on eClass by 4:30 pm on the due date.
- Late assignments will be penalized at the rate of 20% of the total grade per day.

COURSE OUTLINE

Course Introduction & Global Context of Industrial Water Management
Characterization of Industrial Water and Wastewater
Water Balances, Auditing, and Minimization
Physical–Chemical Treatment I
Physical–Chemical Treatment II
Biological Treatment I — Aerobic Processes
Biological Treatment II — Anaerobic Processes & Nutrient Removal
Midterm Examination and Advanced Oxidation
Advanced Oxidation and Residuals/Biosolids Management
Sector Case Studies I — Energy and Resource Industries
Sector Case Studies II — Manufacturing and Process Industries
Zero Liquid Discharge, Resource Recovery, and Sustainability
Emerging Issues, Policy, and Term Project Presentations