STEVENS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF CIVIL ENVIRONMENTAL AND OCEAN ENGINEERING

EN 423/424
ENVIRONMENTAL ENGINEERING SENIOR DESIGN

Lecture Tuesday/Thursday, 2:30 – 4:20 p.m., Rocco room 201
Instructor Dr. Tsan-Liang Su

Office Hours Monday 13:00 – 16:00 or By appointment (201) 216-5697
E-mail: t1su@stevens.edu
Room 104, James C. Nicoll Lab (Environmental Lab)

Prerequisite: EN 322

Catalog description:
Capstone design course using a group design project to integrate principles of environmental process design through an open-ended problem-solving situation.

References

- *"Chemical Engineering Design", G. Tower and R. Sinnot, ISBN 978-0-7506-8423-1*
- *"Wastewater Treatment Plants", by S. Qasim, ISBN: 1-56676-134-4*
- *"Plant Design and Economics for Chemical Engineers", by M.S. Peters and K.D. Timmerhaus, ISBN: 0-07-049582-3*

Goals:
To provide students with an understanding of plant design including all engineering aspects involved in the development of an either new, modified, or expanded industrial plant. Student shall be able to make economic evaluation of new processes, designing individual piece of equipment for the proposed project, or developing a plant layout for coordination of the overall plant operations.

Grading
20% participation and attendance at classroom and design team meetings
30% presentation ratings of attendees at final design oral presentation
50% final project report. The final group project report is adjusted for individuals based on the sections prepared by each team member.

The grade of the design report is broken down in detail as follows:
1: (10%) quality of writing

2: (20%) report organization such as executive summary, introduction, design sections, tables, figures, and headings
3: (20%) introductory section
4: (20%) experimental procedures and results
5: (20%) Design of an engineering system or unit
6: (10%) economics, environmental and social issues

Two to four students will work in a team to develop a design project. The design is at the preliminary design level. In some cases, you will be working with an outside design engineering advisor. You and your teammates are jointly responsible for all the tasks of the project. You should form your team with clear responsibilities for each member, both in terms of technical tasks and organizational/leadership tasks. Team members should rotate leadership roles. These roles include:

- Team leader – calls for schedules, sets agenda, and runs meetings
- Secretary – keeps "minutes" of the meeting with notes of what was accomplished, and a list of "action items"
- Other members should report on accomplishments achieved prior to each meeting based on action items assigned to them at the previous meetings.

Deliverables of the project:

- Ongoing presentations during the execution of the project
- Formal oral presentations of EN423 and EN424
- Final reports of EN423 and EN424
- Stevens Innovation Expo poster presentation

The final design report should include the following sections:

- Executive Summary: objectives, system or unit designed, problems solved, or improvement made.
- Introduction: literature review of relevant technologies, publications, regulations, environmental impacts, sustainability, and social, legal, political, and ethical considerations.
- Experimental procedures and results.
- Design of an engineering system or unit, which may include process design of individual unit processes, plant layout, hydraulic grade line, pump and pipe design, flow diagram, and mass balance.
- Economic analysis based the costs of materials and disposal of wastes.
- Reference: a list of papers, reports, and other documents cited in the report