

Texas A&M University – San Antonio
Department of Natural Sciences

WATR 3317/5360 Water Resources Sustainable Use and Conservation Policy and Practice

(3 credit hours)

Spring 2025, MW 7:00 – 8:15 pm

Contact Information: Dr. Walter Den

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Office Hours:

Regular hours will be MW 1:00-3:00 pm. Please email me if you wish to meet with me during the office hours by Zoom or in-person. I will accommodate in-person request as much as possible.

Required Materials:

Textbook and Assigned Reading (reading assignments will be posted on Blackboard):

1. Seneviratne, M. 2007. *M*. Amsterdam: Elsevier Science. ISBN: 9781856174893/9780080525068.
2. Class notes prepared by the instructor (on Blackboard)
3. Articles and reported (these will be posted on Blackboard weekly)

Course Description:

The primary goal of this course is to examine the existing practices of water conservation goals and techniques for several key water-consuming sectors, including industrial, agriculture, and commercial sectors. The course will also practice how to make water conservation strategies at corporate level and integrate water conservation as part of a circular economy. The class will study several cases of economy-driving industries such as oil refinery, semiconductor and food and beverage production, as well as water-efficient irrigation methods.

The course will consist of five modules basing on separate but interlinking topics, namely:

- Module 1 examines the water management plan for the state of Texas.
- Module 2 discusses the water (and energy) conservation as an integral part of corporate social responsibilities and how corporates strategize water conservation goals.
- Module 3 introduces the characteristics of selected industries and their water consumption pattern and water conservation goals and methods.
- Module 4 focuses on water consumptions in common industrial cooling and heating facilities and the water conservation opportunities.
- Module 5 looks at irrigation practices and the existing and potential water-saving techniques.

Learning Outcomes:

This course is to familiarize the student with the water conservation needs and opportunities across industrial, commercial, and agricultural sectors. While reading materials are provided as topic-guiding basis, students should expect intense and independent information gathering, writing, and reporting throughout the course. Specifically:

- A. Students will demonstrate the ability to gather and interpret the information as instructed;
- B. Students will demonstrate the ability to use Excel spreadsheet to construct water flow balance for well-defined systems;
- C. Students will gain experience in conceptual design of water conservation plan by performing industrial survey-based project; and

Course Requirements:

Typically, Mondays will be lecture days, while Wednesdays will be discussion days. Students are expected to attend all lectures, and come prepared for discussions. Discussions are necessary because the nature of the course subject requires supplementary materials outside the textbook. *Attendance during discussions is mandatory*, and attendance is reflected in the grade (see course grading, below).

Course Grading: The course grades are broken down as follows: Midterm exam (25%), class project (and presentation) (25%), group presentations (25%), and contributions to/leading discussions (25%). Grades will be based on the percentage of points earned from the total (90% = A, 80% = B, 70% = C, 60% = D). In principle, grade curving will not be used in this course.

Exams will be based on lectures, assigned primary literature and textbook chapters; read your text to help you understand the material.

Policies:

- 1) No make-up exams will be given without approval before a scheduled exam. Unexcused, missed exams, receive a score of zero.
- 2) Having more than one unexcused absence for a discussion day will lower the discussion score one full letter grade for each unexcused absence.
- 3) Academic integrity is expected of all students at all times (see current Texas A&M University – San Antonio academic catalog). Make sure you take care of all personal needs (e.g. bathroom, etc.) before exams. Leaving the room during an exam for any reason ends the exam.
- 4) **Attitude and perseverance are everything!** Performance is more than just about grades. I am a big proponent of note-taking, because writing notes help you organize your thoughts and focus on lectures. Do not be over-confident of relying on your memory.

Tentative outline of Topics

- **Check regularly the Blackboard for weekly reading assignments.**

- (The following schedule serves as a guideline only; actual course may deviate from the schedule and the instructor reserves the right to modify the schedule and/or class topics as necessary)

Week	Date	Class Topic
1	1/20	MLK Day. No class
	1/22	Class introduction + class project
2	1/27	Water management structure
	1/29	Texas Water Management Planning
3	2/3	Corporate Social Responsibility/Sustainability Reporting
	2/5	Class Report 1 – Regional Water Plans
4	2/10	Environmental performance metrics and benchmarking
	2/12	CSR reporting examples
5	2/17	Industry I: Microchip manufacturing – understanding the process
	2/19	Class Report 2 - Industry-specific CSRs
6	2/24	Water consumption benchmark
	2/26	Quantifying water consumption – Water balance chart
7	3/3	WBC exercise
	3/5	WBC exercise
8	Spring Break	
9	3/17	Industrial heating and cooling
	3/19	Midterm
10	3/24	Water quality and quantity in reuse
	3/26	Cost analysis
11	3/31	Class exercise on cost analysis
	4/2	Industry II: Oil & Gas industry – Description of the industry
12	4/7	Water consumption for ‘fracking’- produced water management
	4/9	Introduction to PARETO project (or other applications)
13	4/14	Class Report 3 – Paper reading representations
	4/16	Industry III: Food & Beverages – Description of the industry
14	4/21	Water consumption for food production and packaging
	4/23	Water-energy-food nexus
15	4/28	Report 4 – Class project report I
	4/30	Report 4 – Class project report II
16	5/5	Closing
	5/7	Final Exam Week

January 28	Last day to register
February 5	Census Date
February 6	Drop for non-payment
April 21	Last day to drop with an automatic grade of "W"
May 5	Last day of scheduled classes for weekday classes
May 6	Study day - No classes
May 7-May 13	Final examinations
May 13	End of term