

COLORADO STATE UNIVERSITY  
DEPARTMENT OF CIVIL and ENVIRONMENTAL ENGINEERING  
CIVE 541

## **Physical Chemical Water Treatment Processes.**

*2021 FALL*

Lecture:            Tuesday and Thursday            12:30-1:45            Scott 231

Instructor: Tiezheng Tong

Office Hours: 2-3 pm Thursday (and upon request)

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Description: Theory and practice of separations and conversions in water treatment process. Reactor theory, filtration, adsorption, mass transfer, oxidation, membrane technologies, biological reactors, disinfection.

*This course will provide necessary knowledge for the students to work in the water industry.*

***PRIMARY TEXT*** (Highly recommended)

Water Treatment, Principles and Design, Third Edition, MWH, Wiley, 2012, ISBN 978-1-118-10375-3

### ***ADDITIONAL REFERENCES***

Transport Modeling for Environmental Scientists and Engineers, 2009, Wiley Publishers, ISBN 978-0470260722

Water Quality Engineering, Physical/Chemical Treatment Processes, 2013, Wiley Publishers, ISBN 978-1-118-16965-0

Water Quality and Treatment, Sixth Edition, 2011, ISBN: 978007001659

Metcalf and Eddy, *Water Reuse*, First Edition, McGraw-Hill, 2006, ISBN 0-07-145927-3.

Kawamura, S., *Water Treatment Facilities*, Wiley Publishers, 2000, ISBN 0-471-35093-1

Stumm, W., and Morgan, J.J., *Aquatic Chemistry*, Third Edition, John Wiley & Sons, Inc., New York, 1996, ISBN 0-471-83941-8.

***GRADING***

Participation	10%
Homework	30%
Mid-term Exam	30%
Final Exam	30%

***COURSE SYLLABUS***

<b>WEEK</b>	<b>LECTURES</b>
1	Introduction to Water Treatment Systems
2	Chemical Reaction Engineering I
3	Chemical Reaction Engineering II
4	Coagulation and Sedimentation Processes I
5	Coagulation and Sedimentation Processes II
6	Granular media Filtration process
7	Membrane Processes I: Pressure-Driven Process

8	Membrane Processes II: Non-pressure Driven Processes
9	Membrane Processes III: Concentration Polarization and Membrane Fouling
10	Oxidation theory and Advanced oxidation processes
11	Review in Preparation of Mid-term Exam
12	Buffer Class (Mid-term Exam or Start of Adsorption Processes)
13	Principle and Applications of Adsorption processes
14	Thanksgiving break
15	Disinfection and Disinfection Byproducts
16	Applications of nanotechnology in water treatment