

# CHEG 4273/5273 CORROSION CONTROL

**INSTRUCTOR: William A. Myers**

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**TEXT: “Corrosion Engineering” 3<sup>rd</sup> Ed, by M  
Fontana. ISBN 0-07100360-6**

I intend this to be a practical course for practical engineers. If you want a rigorous course just let me know and I will help you enroll in Physical Chemistry. We will use a little electrochemistry a little crystallography, lots of phase diagrams, a little diffusion theory, some economics (as in Design 1), and a lot (I hope) of common sense.

We will study some of the major variables that govern corrosion and some of the other mechanisms by which metals fail. We cannot completely stop corrosion (thermodynamics says so); we have to live with it. Our goal is to prevent *unexpected* failure and to reduce the cost associated with corrosion to an acceptable level. We do this by *intelligent* design and materials selection; for example (Lesson 1) never specify “stainless steel.” Which stainless steel? This is why we are called engineers.

The FE exam contains a section dealing with the properties of engineering materials. A byproduct of this course should be the ability to score well on that section.

We will have three tests and some homework – some tests will be closed book/notes. If you insist we can have a final. I advise that you not insist.

As in all undertakings of the Ralph E. Martin Department of Chemical Engineering, safety is of paramount concern. In the event of inclement weather you should never attempt to come to class if you consider it to be unsafe. Stay at home and send me an email.

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*Tentative – All Dates Subject to Change at Instructor Discretion*

Lecture 1	Week 1	Introduction
Lecture 2		Corrosion in Action
Lecture 3		How Metals Fail
Lecture 4		Electrochemistry (Homework 1)
Lecture 5	Week 2	Crystal Structure (Homework 2)
Lecture 6		Crystal Structure (Homework 3)
Lecture 7		Equilibrium Diagrams
Lecture 8		Equilibrium Diagrams (Homework 4)
Lecture 9	Week 3	Reaction Rates (Homework 5)
Lecture 10		Eight Forms of Corrosion
Lecture 11		Eight Forms of Corrosion
		Exam 1
Lecture 12	Week 4	Atmospheric Corrosion
Lecture 13		Aqueous Corrosion (Homework 6)
Lecture 14		Underground Corrosion
Lecture 15	Week 5	Ferrous Metals
Lecture 16		Ferrous Metals
Lecture 17		Ferrous Metals
Lecture 18		Ferrous Metals
	Week 6	Exam 2
Lecture 19		Light Metals
Lecture 20		Cu and Cu Alloys

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Lecture 22	Week 7	Ni and Ni Alloys
Lecture 23		Pb, Zn, Sn
Lecture 24		Zr, Ta, Nb, etc
Lecture 25	Week 8	Cost Estimation
		Review
		Test 3