

An asynchronous, pre-recorded, online short course

Corrosion: Fundamentals and Experimental Methods

Fontana Corrosion Center, The Ohio State University, Columbus, OH

October 16, 2023 – November 17, 2023

The Corrosion: Fundamentals and Experimental Methods course will cover the fundamentals of corrosion and various electrochemical techniques. Lectures and laboratories are used to illustrate how electrochemical techniques are applied when they should be used, and how the various techniques can be integrated to solve complex problems. The course will be useful for people entering the corrosion field and for professionals looking for a refresher course.

This course will be offered in an online, asynchronous format, with pre-recorded lectures and lab demonstrations from a live, online course offered in May 2023. Students will have access to all these recordings one week before the course begins and will continue to have access until December 1. They will be able to view the recordings at their own pace during that time. There will also be many opportunities between October 16 – November 17 to interact in live, synchronous sessions with the instructors to ask questions or discuss issues as described in detail below.

Instructors:

Dr. Gerald Frankel, Fontana Corrosion Center, OSU

Dr. Jenifer Locke, Fontana Corrosion Center, OSU

Dr. Xiaolei Guo, Fontana Corrosion Center, OSU

Dr. Rudy Buchheit, University of Kentucky

The course will include these topics:

1. Thermodynamics of corrosion
2. Kinetics of corrosion
3. Polarization
4. Corrosion rate measurement techniques
5. Passivity/localized corrosion
6. Electrochemical impedance spectroscopy
7. Environment Assisted Cracking
8. Corrosion protection with Coatings
9. Atmospheric Corrosion

Upon completion of the course students will be able to:

- Understand the basic science underpinning the corrosion of metals.
- Be able to recognize the various forms of corrosion and their underlying causes.
- Be aware of various approaches for mitigating corrosion.
- Know how to perform electrochemical measurements to assess corrosion rate and susceptibility.

Online Delivery:

The instructional material and content for the course consists of pre-recorded lectures and laboratory exercises previously recorded from a five-day offering in May 2023. The labs show the real time activities of a teaching assistant doing the experiment and the computer screen of the software controlling the instrumentation, along with the narration by an instructor.

There are roughly 30 hours of pre-recorded material students will be able to watch via streaming at their own pace once registered and until December 1, 2023. This will allow for a relaxed pace providing students with plenty of time to work through the material. We recommend that you make time for this course beyond just watching all of the recorded content. You should plan to note your questions and either attend a discussion period (described below) to ask them or make use of the discussion board on the course website. You should also make time to analyze the lab data provided to you to complete the lab exercises. Doing this on your own will greatly enhance what you take away from this course.

On one day of each week during the five-week course from October 16, 2023 to November 17, 2023, the instructors will be available for live questions and discussion sessions. On those days, the live question and discussion sessions will be held at five different hourlong periods spaced between 7:00am EST to midnight EST. This will allow students anywhere around the globe to find times convenient for joining a live discussion. Students will also be able to ask questions at any other time using the discussion board on the course website, which will be monitored by the course instructors.

The times for the live sessions will be as follows, given in Eastern US time (to convert to your local time use <https://www.timeanddate.com/worldclock/converter.html>)

0700 - 0800

1100 - 1200

1500 - 1600

1900 - 2000

2300 - 2400

The dates for live sessions will be as follows:

Monday, October 16

Tuesday, October 24

Wednesday, November 1

Thursday, November 9

Friday, November 17

The content from the previous offering in May 2023 was delivered over a five-day period, Monday-Friday. For this offering, students will be expected to have watched all the material associated with the

Monday class prior to the live discussion session periods on October 16. Similarly, all the material associated with the Tuesday class should be watched prior to the live sessions on October 24th, and so on for the remaining weeks and sessions until Friday, November 17. To watch all the material for each discussion session will require on average about one hour per day of viewing over each one-week period.

Contact Information:

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