



# UNIVERSITY OF CALGARY

## DEPARTMENT OF CHEMISTRY COURSE OUTLINE

1. **Course:** Chemistry 669.01, Applied Electrochemistry, **Winter 2016**  
L01  
Instructors: Viola Birss; Office: ES 656; Phone: 403-220-6432; Email: [birss@ucalgary.ca](mailto:birss@ucalgary.ca), Office Hours: TBD

2. **Prerequisites:** (<http://www.ucalgary.ca/pubs/calendar/current/chemistry.html#6539>)

Note: The calendar description and the Faculty of Science policy on prerequisites/antirequisites are described in section 3.5 C. of the online University Calendar (<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>). Students are responsible to ensure that they meet all prerequisite requirements for each course in which they are registered. Students who do not meet these requirements will be deleted from the course

3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

:	Assignments	40%
	Technical Paper	15%
	Oral Presentation	10%
	Class Participation	5%
	Final Examination	30% (To be scheduled by the Registrar)

**Grading Scale:** The conversion between course percentage and letter grade is given below:

A+	A	A-	B+	B	B-
100% - 95%	94% - 85%	84% - 80%	79% - 75%	74% - 70%	69% - 65%
C+	C	C-	D+	D	F
64% - 60%	59% - 55%	54% - 50%	49% - 45%	44% - 40%	< 40%

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar

**Recommended Course Material:** *Modern Electrochemistry* by J. O'M. Bockris and A.K.N. Reddy; *Industrial Electrochemistry* by D. Pletcher (need to dig out details)

6. **Examination Policy:** Calculators will be allowed in examinations. Students should also read the Calendar, Section G, on Examinations.
7. **Writing across the curriculum statement:** In this course, the quality of the student's writing in assignments and in term paper/poster will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.

### 8. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **Academic Misconduct:** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties

- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- (c) **Academic Accommodation Policy:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at [http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities\\_0.pdf](http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf). Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Chemistry, Dr. Ashley Causton, by email [ahugchem@ucalgary.ca](mailto:ahugchem@ucalgary.ca) or phone (403) 220-5353.
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
- (f) **Student Union Information:** VP Academic Phone: 403 220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca)  
SU Faculty Rep. Phone: 403 220-3913 Email: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca);  
Student Ombuds Office: 403 220-6420 Email [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca) <http://ucalgary.ca/provost/students/ombuds>
- (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (h) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

**Department Approval:** Approved by Department Head

**Date:** November 30, 2015

**Chemistry 669.01  
Applied Electrochemistry  
Winter, 2016**

**OUTLINE**

1. Fundamental aspects of electrochemistry (origin of electrode potentials, measurement of potentials, reference electrodes, current/voltage relationships based on activation and diffusion control, Butler-Volmer relationship, Tafel plots, overview of standard electrochemical techniques, etc).
2. The corrosion of metals (Electrochemical series, potential-pH (Pourbaix) diagrams, Evans diagrams (kinetics of corrosion), classes of corrosion, corrosion protection, corrosion measurements).
3. Battery systems (classical primary and secondary batteries, evaluation of battery performance, modern high-energy battery systems).
4. Fuel-cells (fuel cell types, performance plots, fuel cell kinetics, material challenges, etc.)
5. Other industrial electrochemical processes (topics to be covered depend on time remaining and on student interests).