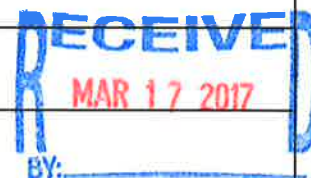


<b>ORIGINATOR'S SECTION:</b>														
<b>1. College:</b> <input type="checkbox"/> CHABSS <input type="checkbox"/> CoBA <input type="checkbox"/> CoEHHS <input checked="" type="checkbox"/> CSM	<b>Desired Term and Year of Implementation (e.g., Fall 2008):</b> Fall 201 <sup>1</sup> 6													
<b>2. Course is to be considered for G.E.? (If yes, also fill out appropriate GE form*)</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No														
<b>3. Course will be a variable-topics (generic) course?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No ("generic" is a placeholder for topics)														
<b>4. Course abbreviation and Number:*</b> CHEM 514														
<b>5. Title: (Titles using jargon, slang, copyrighted names, trade names, or any non-essential punctuation may not be used.)</b> <u>Electrochemical Methods</u>														
<b>6. Abbreviated Title for PeopleSoft:</b> (no more than 25 characters, including spaces) Electrochem. Methods														
<b>7. Number of Units:</b> 3														
<b>8. Catalog Description: (Not to exceed 80 words; language should conform to catalog copy. Please consult the catalog for models of style and format; include all necessary information regarding consent for enrollment, pre- and/or corequisites, repeated enrollment, crosslisting, as detailed below. Such information does <u>not</u> count toward the 80-word limit.)</b>  Introduces modern electrochemical methods from a theoretical and practical perspective. Fundamentals of the electrode/solution interface, interfacial electron transfer and mass transport are covered, and their application to a variety of modern electrochemical techniques is demonstrated. <i>Prerequisite: A minimum grade of C (2.0) in CHEM 401 and CHEM 416 or classified graduate standing.</i>														
<b>9. Why is this course being proposed?</b>  This course is being proposed as part of the new Masters in Chemistry program. CHEM 514 will serve as an elective course.														
<b>10. Mode of Instruction*</b> For definitions of the Course Classification Numbers: <a href="http://www.csusm.edu/academic_programs/curriculumschedu ling/catalogcurricula/DOCUMENTS/Curricular_Forms_Tab/Instructional%20Mode%20Conventions.pdf">http://www.csusm.edu/academic_programs/curriculumschedu ling/catalogcurricula/DOCUMENTS/Curricular_Forms_Tab/Instructional%20Mode%20Conventions.pdf</a>														
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Type of Instruction</th> <th style="text-align: center;">Number of Credit Units</th> <th style="text-align: left;">Instructional Mode (Course Classification Number)</th> </tr> </thead> <tbody> <tr> <td>Lecture</td> <td style="text-align: center;">3</td> <td>C-02</td> </tr> <tr> <td>Activity</td> <td></td> <td></td> </tr> <tr> <td>Lab</td> <td></td> <td></td> </tr> </tbody> </table>	Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)	Lecture	3	C-02	Activity			Lab		
Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)												
Lecture	3	C-02												
Activity														
Lab														
<b>11. Grading Method:*</b> <input checked="" type="checkbox"/> Normal (N) (Allows Letter Grade +/-, and Credit/No Credit) <input type="checkbox"/> Normal Plus Report-in-Progress (NP) (Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress) <input type="checkbox"/> Credit/No Credit Only (C) <input type="checkbox"/> Credit/No Credit or Report-in-Progress Only (CP)														
<b>12. If the (NP) or (CP) grading system was selected, please explain the need for this grade option.</b>														
<b>13. Course Requires Consent for Enrollment?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  <input type="checkbox"/> Faculty <input type="checkbox"/> Credential Analyst <input type="checkbox"/> Dean <input type="checkbox"/> Program/Department - Director/Chair														
<b>14. Course Can be Taken for Credit More than Once?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, how many times?                      (including first offering)														
<b>15. Is Course Crosslisted:</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  If yes, indicate which course                      and check "yes" in item #22 below.														
<b>16. Prerequisite(s):</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                      CHEM 404 and CHEM 416 or classified graduate standing.														
<b>17. Corequisite(s):</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No														



**18. Documentation attached:**
☐ Syllabus    ☒ Detailed Course Outline
**19. If this course has been offered as a topic, please enter topic abbreviation, number, and suffix:\*****20. How often will this course be offered once established?\*** In a rotation of every 2.5 to 3 years for elective courses**PROGRAM DIRECTOR/CHAIR - COLLEGE CURRICULUM COMMITTEE SECTION:***(Mandatory information – all items in this section must be completed.)***21. Does this course fulfill a requirement for any major (i.e., core course or elective for a major, majors in other departments, minors in other departments)?**    ☒ Yes    ☐ No**If yes, please specify:**

Elective course in the Masters of Science in Chemistry.


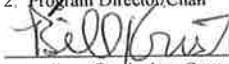
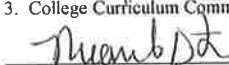
**22. Does this course impact other discipline(s)? (If there is any uncertainty as to whether a particular discipline is affected, check "yes" and obtain signature.)**    ☐ Yes    ☒ No

If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

Discipline	_____	_____	_____ Support	_____ Oppose
	Signature	Date		

Discipline	_____	_____	_____ Support	_____ Oppose
	Signature	Date		

**SIGNATURES : (COLLEGE LEVEL) :**

M. Schmidt	8/4/2016
1. Originator (please print or type name)	Date
	8/9/16
2. Program Director/Chair	Date
	12/14/16
3. College Curriculum Committee	Date
	12/14/16
4. College Dean (or Designee)	Date

**(UNIVERSITY LEVEL)**

5. UCC Committee Chair	Date
6. Vice President for Academic Affairs (or Designee)	Date
7. President (or Designee)	Date

\* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

R.P. \_\_\_\_\_ Tracker ✓

## Chemistry 514—Electrochemical Methods PROSPECTIVE COURSE OUTLINE

**Dr. Michael H. Schmidt**

schmidt@csusm.edu

321 Science Hall 2

760-750-4138

**Course Description:** Introduces modern electrochemical methods from a theoretical and practical perspective. Fundamentals of the electrode/solution interface, interfacial electron transfer and mass transport are covered, and their application to a variety of modern electrochemical techniques is demonstrated. Prerequisites: CHEM 401 and CHEM 416.

### **Student Learning Outcomes:**

- Students will be able to choose the correct electrochemical method for obtaining particular information from an electrochemical system, and be able to derive this information from raw data.
- Students will be able to explain, in clear written English, with diagrams or mathematics where appropriate, why particular electrochemical methods are well suited to obtaining certain kinds of information from an electrochemical system.
- Students will be able to explain, in clear written English, with diagrams or mathematics where appropriate, fundamental concepts of electrochemistry such as the double layer, electrochemical potentials, mass transport, and interfacial electron transport.

**Prerequisite:** CHEM 401 and CHEM 404.

**Textbooks:** Allen J. Bard, Larry R. Faulkner; *Electrochemical Methods: Fundamentals and Applications*, 2<sup>nd</sup> Edition. New York: John Wiley & Sons, 2000. (B&F)

**Course Activities:** Students will do graded homework for each week.

There will be a written take-home midterm exam and a take-home final exam.

An end-of-semester term paper of roughly 10 pages will involve students applying concepts of the course to published literature. This assignment fulfills the All-University Writing Requirement.

**Grading Scheme:**

	# of Items	Pts. Per Item	Total Points
Homework	15	10	150
Term Paper	1	50	50
Midterm Exam	1	100	100
Final Exam	1	100	100
			400

**Anticipated schedule:** (subject to change)

<b>Lectures</b>	<b>Topics</b>	<b>Readings, B&amp;F</b>
Week 1	Introduction to Electrodes, Cells, Potentials and Currents	Chapter 1
Week 2	Potentials and Cell Thermodynamics	Chapter 2
Week 3	Electron Transfer Kinetics	Chapter 3
Week 4	Electrochemical Instrumentation	Chapter 15
Week 5	Migration and Diffusion; Cottrell equation	Chapter 4 5.1; 5.2
Week 6	Sampled Current Voltammetry	5.4-5.6
Week 7	Potential Sweep Methods	Chapter 6
Week 8	Potential Sweep Methods	Chapter 6
Week 9	Polarography and Pulse Methods	Chapter 7
Week 10	Polarography and Pulse Methods	Chapter 7
Week 11	Rotating Disk Electrode Techniques	Chapter 9
Week 12	Flow Electrolysis, Stripping Analysis	11.6; 11.8
Week 13	AC techniques	Chapter 10
Week 14	Double-Layer Structure and Adsorption	Chapter 13
Week 15	Chemically Modified Electrodes	Chapter 14