California State University San Marcos • NEW COURSE • FORM C CHEM 534

ORIGINATOR'S SECTION:

1. College:

☐ **CHABSS** ☐ **CoBA**
☐ **CoEHHS** ☒ **CSM**

Desired Term and Year of Implementation (e.g., Fall 2008):

Fall 2017

2.Course is to be considered for G.E.? (If yes, also fill out appropriate GE form*) ☐ Yes ☒ No

3. Course will be a variable-topics (generic) course? ☐ Yes ☒ No
("generic" is a placeholder for topics)

4. Course abbreviation and Number:* CHEM 534

5. Title: ***(Titles using jargon, slang, copyrighted names, trade names, or any non-essential punctuation may not be used.)***
Advanced Spectroscopic Methods

6. Abbreviated Title for PeopleSoft:
(no more than 25 characters, including spaces)
Adv. Spec. Methods

7. Number of Units: 2

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 not count toward the 80-word limit.)***

Introduces spectroscopic techniques used to elucidate the structures of organic molecules of various molecular weights. Basic theoretical background will be reviewed, then built upon to introduce more advanced techniques. Emphasis will be on solving problems, starting with application of fundamental concepts and techniques and building toward state-of-the-art methods used by the modern organic and bioorganic chemist. *Prerequisite: A minimum grade of C (2.0) in CHEM 416 or classified graduate standing.*

9. Why is this course being proposed?

This course is being proposed as part of the new Masters in Chemistry program. This course will serve as an elective course.

10. Mode of Instruction*

For definitions of the Course Classification Numbers:
http://www.csusm.edu/academic_programs/curriculumscheduling/catalogcurricula/DOCUMENTS/Curricular_Forms_Tab/Instructional%20Mode%20Conventions.pdf

Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)
Lecture	2	C-02
Activity		
Lab		

11. Grading Method:*
☒ Normal (N) *(Allows Letter Grade +/-, and Credit/No Credit)*
☐ Normal Plus Report-in-Progress (NP) *(Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress)*
☐ Credit/No Credit Only (C)
☐ Credit/No Credit or Report-in-Progress Only (CP)

12. If the (NP) or (CP) grading system was selected, please explain the need for this grade option.

13. Course Requires Consent for Enrollment? ☐ Yes ☒ No

☐ Faculty ☐ Credential Analyst ☐ Dean ☐ Program/Department - Director/Chair

14. Course Can be Taken for Credit More than Once? ☐ Yes ☒ No
If yes, how many times? (including first offering)

15. Is Course Crosslisted: ☐ Yes ☒ No

If yes, indicate which course and check "yes" in item #22 below.

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16. Prerequisite(s): ☒ Yes ☐ No CHEM 416 or classified graduate standing.

17. Corequisite(s): ☐ Yes ☒ No

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

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 2.5 to 3-year rotation of 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) :

J. Trischman 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

Office of Academic Programs BS ~~Banner~~: _____ Catalog _____ Revised 3/28/2007

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

RP____ Tracker ✓

Chemistry 534–Advanced Spectroscopic Methods
PROSPECTIVE COURSE OUTLINE

Dr. Jacqueline A. Trischman
trischma@csusm.edu
Science Hall 1-119
760-750-4206

Course Description: Introduces spectroscopic techniques used to elucidate the structures of organic molecules of various molecular weights. Basic theoretical background will be reviewed, then built upon to introduce more advanced techniques. Emphasis will be on solving problems, starting with application of fundamental concepts and techniques and building toward state-of-the-art methods used by the modern organic and bioorganic chemist. Prerequisite: CHEM 416.

Student Learning Outcomes:

Students will

- Demonstrate knowledge of the principles on which spectroscopic methods are based
- Analyze spectroscopic data from organic compounds independently and determine structure using modern techniques
- Combine fundamental principles of operation, knowledge of the most critical variables for each instrument, and the analysis of data into a solid understanding of instrumental chemical analyses used in biochemistry and environmental fields

Textbooks: Philip Crews, Jaime Rodriguez, & Marcel Jaspars; *Organic Structure Analysis, 2nd Edition.* Oxford Press , 1998.

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 research paper reviewing the application of a specific technique to an interesting problem will be used to fulfill the All-University Writing Requirement. The paper will be presented to the class as well.

Grading Scheme:

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

Anticipated schedule: (subject to change)

Lectures	Topics
Week 1-2	Review of properties and behavior of electromagnetic radiation
Week 3	Atomic Spectroscopy and its applications
Week 4	Molecular Spectroscopy: Electronic analysis
Week 5	Molecular Spectroscopy: Vibrational analysis
Week 6	Molecular Spectroscopy: Rotational analysis
Week 7	Lasers
Week 8	Raman Spectroscopy
Week 9	Nuclear Magnetic Resonance: Review of 1-D Topics
Week 10	NMR 2-D Techniques: COSY/TOCSY
Week 11	NMR 2-D Techniques: HMQC/HMBC
Week 12	NMR 2-D Techniques: ROESY/ NOESY
Week 13	ESR Techniques
Week 14	Modern Biological Applications
Week 15	Modern Environmental Applications
Week 15	Chemically Modified Electrodes