

CHEM 134: PRINCIPLES AND APPLICATIONS OF MASS SPECTROMETRY

In Workflow

1. CHEM Committee Chair (robertslm@csus.edu)
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Approval Path

1. Tue, 28 Nov 2023 00:01:30 GMT
Linda Roberts (robertslm): Approved for CHEM Committee Chair
2. Wed, 29 Nov 2023 19:34:48 GMT
Susan Crawford (crawford): Approved for CHEM Chair
3. Wed, 06 Dec 2023 23:41:16 GMT
Mikkel Jensen (mikkel.jensen): Rollback to Initiator
4. Wed, 10 Apr 2024 19:19:23 GMT
Linda Roberts (robertslm): Approved for CHEM Committee Chair
5. Thu, 11 Apr 2024 04:32:24 GMT
Susan Crawford (crawford): Approved for CHEM Chair
6. Wed, 17 Apr 2024 22:31:15 GMT
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
7. Wed, 17 Apr 2024 22:31:41 GMT
Shannon Datwyler (datwyler): Approved for NSM Dean

New Course Proposal

Date Submitted: Wed, 10 Apr 2024 12:55:23 GMT

Viewing: CHEM 134 : Principles and Applications of Mass Spectrometry

Last edit: Wed, 28 Aug 2024 18:02:19 GMT

Changes proposed by: Justin Miller-Schulze (217361574)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
Justin Miller-Schulze	j.miller-schulze@csus.edu	916 278 7409

Catalog Title:

Principles and Applications of Mass Spectrometry

Class Schedule Title:

Princip and App Mass Spec

Academic Group: (College)

NSM - Natural Sciences & Mathematics

Academic Organization: (Department)

Chemistry

Will this course be offered through the College of Continuing Education (CCE)?

No

Catalog Year Effective:

Fall 2024 (2024/2025 Catalog)

Subject Area: (prefix)

CHEM - Chemistry

Catalog Number: (course number)

134

Course ID: (For administrative use only.)

TBD

Units:

3

Is the only purpose of this change to update the term typically offered or the enforcement of existing prerequisites at registration?

No

In what term(s) will this course typically be offered?

Fall term only - odd years

Does this course require a room for its final exam?

Yes, final exam requires a room

Does this course replace an existing experimental course?

No

This course complies with the credit hour policy:

Yes

Justification for course proposal:

Mass spectrometry is an analytical technique for characterizing chemicals that has become increasingly popular over the past 30 years and is central to current research in all of the sub-disciplines (analytical, organic, inorganic, physical, and biochemistry) of Chemistry. Mass spectrometry is a fundamental technique in the laboratories and organizations that employ CSUS graduates: pharmaceutical labs, regulatory/environmental testing, food and beverage production, etc. An undergraduate (this course, CHEM134) and paired graduate course (CHEM234) will provide a non-lab, higher enrollment upper-division Chemistry elective to facilitate shorter time-to-degree for our undergraduate students while at the same time provide a graduate elective course to serve our graduate students.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)

Lecture/discussion course focused on the principles and applications of mass spectrometry as an analytical technique. Topics will include ionization, mass analyzers, and detection, as well as tandem mass spectrometry techniques, specialized software applications, and data analysis approaches.

Are one or more field trips required with this course?

No

Fee Course?

No

Is this course designated as Service Learning?

No

Is this course designated as Curricular Community Engaged Learning?

No

Does this course require safety training?

No

Does this course require personal protective equipment (PPE)?

No

Course Note: (Note must be a single sentence; do not include field trip or fee course notations.)

Students who take CHEM 134 at Sacramento State cannot take CHEM 234 for credit.

Does this course have prerequisites?

Yes

Prerequisite:

CHEM31, CHEM124, CHEM142 or 140B (can be taken concurrently)

Prerequisites Enforced at Registration?

Yes

Does this course have corequisites?

No

Graded:

Letter

Approval required for enrollment?

No Approval Required

Course Component(s) and Classification(s):

Lecture

Lecture Classification

CS#02 - Lecture/Discussion (K-factor=1WTU per unit)

Lecture Units

3

Is this a paired course?

Yes

Please confirm that it complies with the Paired Courses Policy and enter the course with which it is paired:

CHEM 234

Is this course crosslisted?

No

Can this course be repeated for credit?

No

Can the course be taken for credit more than once during the same term?

No

Description of the Expected Learning Outcomes and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre- and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Students should be able to DESCRIBE different ionization methods as they relate to mass spectrometry.	Homework Assignments, Midterm Exams, Final Exam.
2	Students should be able to quantitatively and qualitatively EXPLAIN mass analyzers, individually and in series, in mass spectrometers, and COMPARE performance metrics of mass spectrometers.	Homework Assignments, Midterm Exams, Final Exam.
3	Students should be able to COMPUTE monoisotopic masses for molecular ions, fragment ions, isotopes, and adducts, and SOLVE for mass errors in these quantities.	Homework Assignments, Midterm Exams, Final Exam.
4	Students should be able to use specialized mass spectrometry data analysis software to COMPUTE and ANALYZE quantities related to quantitative and qualitative analysis aspects of mass spectrometry.	Computer Lab Assignments.

- 5 Students should be able to DISCUSS, JUDGE, and INTERPRET current applications of mass spectrometry from the peer-reviewed literature. Final Project (Paper) and Discussion questions (Final Project Questions) following Final Project presentations.

Attach a list of the required/recommended course readings and activities:

Form A Schedule.pdf

For whom is this course being developed?

Majors in the Dept

Is this course required in a degree program (major, minor, graduate degree, certificate?)

No

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?

No

Will there be any departments affected by this proposed course?

No

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.

I/we agree

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Intellectual and practical skills
Integrative learning

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

GE Course and GE Goal(s)

Is this a General Education (GE) course or is it being considered for GE?

No

Please attach any additional files not requested above:

CHEM134_Syllabus.pdf

Reviewer Comments:

Mikkel Jensen (mikkel.jensen) (Wed, 06 Dec 2023 23:41:17 GMT): Rollback: • Assessment strategies 1-3: just say "exams," without details of how many are given. (And make sure they're aligned with syllabus; see below.) • Make assessment strategies aligned with syllabus, so that the assessment strategies are all reflected in the graded items in the syllabus. • Update course number in the syllabus (right now it says 251). • Distinguish syllabus for undergrad/grad (attach a separate document to each proposal).

Key: 15004