



**SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS**

New Course Request

SDSU	College of Natural Sciences / Department of Chemistry, Biochemistry and Physics
Institution	Division/Department
Dennis D. Hedge	4/16/2025
Institutional Approval Signature	Date

Section 1. Course Title and Description

Prefix & No.	Course Title	Credits
CHEM 784	Advanced Green Chemistry	3

Course Description

Green Chemistry is the science of creating safe, energy efficient and non-toxic processes and products that provide sustainable solutions for the environmental problems facing our society today. Green Chemistry education must be integrated into the way we teach scientists from the earliest ages. This course will provide a more in-depth dive into the 12 principles of Green Chemistry to practice green chemistry pedagogy and procedures in their classrooms.

Pre-requisites or Co-requisites

Prefix & No.	Course Title	Pre-Req/Co-Req?
CHEM 783	Introduction to Green Chemistry for the High School Classroom	Pre-Req

Registration Restrictions

None

Section 2. Review of Course

2.1. Will this be a unique or common course?

Unique Course

Prefix & No.	Course Title	Credits
CBE/CHEM 462-562	Green Chemistry and Processes	2-3
CHEM 411-511	Electrochemistry and Green Energy Storage	3

Provide explanation of differences between proposed course and existing system catalog courses below:

CBE/CHEM 462-562 Green Chemistry and Processes, a two-part course, provides in-depth fundamentals of green chemistry and processes. Part 1 (2 credits) highlights key approaches to advancing sustainability through alternative solvents, catalysts, use of greener feedstocks, reaction efficiency, design greener syntheses, waste minimization technology, and examples of green chemistry products and processes. Part 2 (1 credit) focuses on green processes including process metrics, bioprocesses, and design greener chemical processes that reduce the impacts on human health and the environment relevant to the current state of the art.

CHEM 411-511 Electrochemistry and Green Energy Storage is focused on materials and technologies for eco-friendly electrochemical energy generation and storage and hydrogen production by electrolysis. The fundamental principles of the materials structure-properties relationships for advancement the electrochemical system performance is emphasized, and the focus is made on different ways of materials synthesis using methods based on green chemistry principles including eco-friendly recycling.

While both CHEM 411-511 and CBE/CHEM 462-562 focus on green chemistry principles and applications in processes such as energy generation and bioprocessing, they fail to address more basic ideas that would be relevant and implementable for a teacher in a high school classroom to use. The proposed course, CHEM 784, is designed to build on knowledge obtained in CHEM 783 Introduction to Green Chemistry for the High School Classroom to give high school teachers the skills and knowledge to review green chemistry technology analysis through the study of Green Chemistry Challenge winning projects, gain an understanding of how to incorporate toxicology into their curriculum, and delve into the application of green chemistry to student STEM activities and inquiry projects.

Section 3. Other Course Information

3.1. Are there instructional staffing impacts?

No. Schedule Management, explain below: Workload is available to offer this course. It will be offered during the fall semester. This course has been taught as CHEM 691. This request assigns the course a permanent course title and number.

3.2. Existing program(s) in which course will be offered: Chemistry (M.S.) – Chemistry Education Specialization

3.3. Proposed instructional method by university (as defined by [AAC Guideline 2.4.3.A](#)): D - Discussion

3.4. Proposed delivery method by university (as defined by [AAC Guideline 2.4.3.B](#) and [2.4.3.B\(A-1\)](#)): X18 – Online Synchronous

3.5. Term change will be effective: Fall 2025

3.6. Can students repeat the course for additional credit? Yes, total credit limit: No

3.7. Will grade for this course be limited to S/U (pass/fail)? Yes No

3.8. Will section enrollment be capped? Yes, max per section: 20 No

3.9. Will this course equate (i.e., be considered the same course for degree completion) with any other unique or common courses in the common course system database in Colleague and the Course Inventory Report? Yes No

3.10. Is this prefix approved for your university? Yes No

Section 4. Department and Course Codes (Completed by University Academic Affairs)

4.1. University Department: Department of Chemistry, Biochemistry and Physics

4.2. Banner Department Code: SCBP

4.3. Proposed CIP Code: 40.0501

Is this a new CIP code for the university? Yes No

NEW COURSE REQUEST Supporting Justification for On-Campus Review

Melody Jewell	Melody Jewell	2/24/2025
Request Originator	Signature	Date
Brian Logue	Brian Logue	2/25/2025
Department Chair	Signature	Date
Greg Heiberger	Greg Heiberger	3/7/2025
School/College Dean	Signature	Date

1. Provide specific reasons for the proposal of this course and explain how the changes enhance the curriculum.

Green chemistry is an important issue as it relates to creating more human and environmentally friendly processes which reduce waste and hazards. This course aims to address a need for high school teachers who teach chemistry but may not have a chemistry degree to gain a deeper understanding of what green chemistry is and how they can make small changes in their classroom to reduce waste and exposure to hazardous chemicals. Through exploring Green Chemistry Challenge winning projects and toxicology

concepts, students will develop classroom activities and projects that promote inquiry-based learning in the context of green chemistry STEM applications. The course is designed to provide additional knowledge for students in the M.S. in Chemistry with a specialization in Chemistry Education, as well as other high school teachers nationwide. Given that students in this program are located across the country, the course will be offered in a flexible format to accommodate both remote and local teachers. This course has been taught as CHEM 691. This request assigns the course a permanent course title and number.

2. Note whether this course is: Required Elective
3. In addition to the major/program in which this course is offered, what other majors/programs will be affected by this course?
None
4. If this will be a dual listed course, indicate how the distinction between the two levels will be made.
N/A
5. Desired section size 20
6. Provide qualifications of faculty who will teach this course. List name(s), rank(s), and degree(s).
This course will be delivered in conjunction with Beyond Benign and will be facilitated by SDSU faculty.
Matthew Miller, Professor, Ph.D.
Sara Madsen, Senior Lecturer, Ph.D.
Melody Jewell, Senior Lecturer, Ph.D.
Annette Sebuyira is a New York State Master Teacher (Emeritus), a National Board-Certified Teacher, an adjunct professor for Syracuse University and a Beyond Benign Lead Teacher (Certified)
7. Note whether adequate facilities are available and list any special equipment needed for the course.
No special resources or facilities are required to teach this course.
8. Note whether adequate library and media support are available for the course.
Available support is adequate.
9. Will the new course duplicate courses currently being offered on this campus? Yes No
10. If this course may be offered for variable credit, explain how the amount of credit at each offering is to be determined.
N/A