

**SOUTH DAKOTA BOARD OF REGENTS**

**Academic and Student Affairs**  
**Consent**

**AGENDA ITEM: 8 – E (2)**

**DATE: June 22-23, 2022**

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**SUBJECT**

**New Specialization Request – SDSMT – Specialization in Green Chemistry – BS in Chemistry**

**CONTROLLING STATUTE, RULE, OR POLICY**

[BOR Policy 2:23](#) – Program and Curriculum Approval

**BACKGROUND / DISCUSSION**

South Dakota School of Mines & Technology (SDSMT) requests authorization to offer a specialization in Green Chemistry within the BS in Chemistry. The proposed specialization is designed for Chemistry majors who are interested in the area of green and sustainable chemistry. The specialization will require students to take courses related to green chemistry and processes, environmental and sustainable chemistry and renewable energy generation and storage. Students earning this specialization may also continue on to SDSMT's MS in Green in Sustainable Chemistry.

**IMPACT AND RECOMMENDATION**

SDSMT requests authorization to offer the specialization on campus. SDSMT is not requesting additional state resources to offer the program. No new courses will be required.

Board office staff recommends approval of the program.

**ATTACHMENTS**

Attachment I – New Specialization Request Form: SDSMT – Green Chemistry – BS in Chemistry

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**DRAFT MOTION 20220622\_8-E(2):**

I move to authorize SDSMT to offer a specialization in Green Chemistry within the BS in Chemistry, as presented.



## SOUTH DAKOTA BOARD OF REGENTS ACADEMIC AFFAIRS FORMS

### New Specialization

Use this form to propose a new specialization within an existing degree program. Specializations provide students with an alternative to the primary format of the major or it may be one of several tracks within a broad major. Specializations contain courses within the discipline(s) of the existing program. Specializations appear in the institutional catalog and on the transcript. Majors that offer specializations typically have one-third to two-thirds of the credits in common with the remaining course work fulfilling the requirements of the specialization(s) offered. The Board of Regents, Executive Director, and/or their designees may request additional information about the proposal. After the university President approves the proposal, submit a signed copy to the Executive Director through the system Chief Academic Officer. Only post the New Specialization Form to the university website for review by other universities after approval by the Executive Director and Chief Academic Officer.

<b>UNIVERSITY:</b>	SDSM&T
<b>TITLE OF PROPOSED SPECIALIZATION:</b>	Green Chemistry
<b>NAME OF DEGREE PROGRAM IN WHICH SPECIALIZATION IS OFFERED:</b>	Chemistry Bachelor of Science
<b>BANNER PROGRAM CODE:</b>	MCBH
<b>INTENDED DATE OF IMPLEMENTATION:</b>	8/22/2022
<b>PROPOSED CIP CODE:</b>	40.0501
<b>UNIVERSITY DEPARTMENT:</b>	Chemistry, Biology, and Health Sciences
<b>BANNER DEPARTMENT CODE:</b>	MCBH
<b>UNIVERSITY DIVISION:</b>	4L
<b>BANNER DIVISION CODE:</b>	4L

☒ **Please check this box to confirm that:**

- The individual preparing this request has read [AAC Guideline 2.6](#), which pertains to new specialization requests, and that this request meets the requirements outlined in the guidelines.
- This request will not be posted to the university website for review of the Academic Affairs Committee until it is approved by the Executive Director and Chief Academic Officer.

#### University Approval

*To the Board of Regents and the Executive Director: I certify that I have read this proposal, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.*

<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Institutional Approval Signature <i>President or Chief Academic Officer of the University</i>	Click here to enter a <a href="#">date.</a> <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> Date
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Note: In the responses below, references to external sources, including data sources, should be documented with a footnote (including web addresses where applicable).

**1. Level of the Specialization (place an "X" in the appropriate box):**

Baccalaureate ☒ Master's ☐ Doctoral ☐

**2. What is the nature/purpose of the proposed specialization? Please include a brief (1-2 sentence) description of the academic field in this specialization.**

SDSM&T offers the American Chemical Society (ACS)-certified B.S. degree in Chemistry, which meets the national requirements established by ACS. Upon graduation with a bachelor's degree in chemistry, students have knowledge of chemical and physical phenomena at the molecular level.

SDSM&T offers a M.S. program in Green and Sustainable Chemistry. The MS program provides trained individuals with advanced technical innovation in the broad areas of Green and Sustainable Chemistry.

The ***Green Chemistry Specialization*** is designed for the BS chemistry majors who are interested in the area of Green and Sustainable Chemistry. The ***Specialization*** will require the students to take the 400-level courses related to green chemistry and processes, environmental and sustainable chemistry, and renewable energy generation and storage. The students who earn the ***Green Chemistry Specialization*** with the ACS-certified Chemistry B.S. degree will acquire a deep and broad knowledge in Green Chemistry.

**3. Provide a justification for the specialization, including the potential benefits to students and potential workforce demand for those who graduate with the credential. *For workforce related information, please provide data and examples. Data may include, but are not limited to the South Dakota Department of Labor, the US Bureau of Labor Statistics, Regental system dashboards, etc. Please cite any sources in a footnote.***

The proposed ***Green Chemistry Specialization*** is designed for students planning to start a career in a green and sustainable technologies or continue their education in a graduate program that focuses on Green Chemistry (e.g., the MS degree of Green and Sustainable Chemistry offered at SD Mines). The ***Specialization*** will provide the students opportunities to gain knowledge and skills in area of green chemistry and add value to their B.S. degree in Chemistry. The department of Chemistry, Biology, and Health Sciences is the appropriate place to offer this ***Specialization***. The department offers B.S. degree in Chemistry, B.S. degree in Biology, and B.S. degree in pre-Professional Health Sciences, and a MS degree in Green and Sustainable Chemistry.

The proposed addition of ***Green Chemistry Specialization*** to the curriculum of the B.S. degree in Chemistry is consistent with the board-designated mission of the South Dakota Mines to promote student success and to contribute to the state's workforce and economic development. The proposed ***Specialization*** will provide trained individuals who can contribute to South Dakota and the Nation through advanced technical innovation in the proposed areas of Green and Sustainable Chemistry. The program is responding to a nationwide demand of chemists and scientists in the broad area of Green and Sustainable Chemistry as well as to recruit and retain talents for workforce development to support the growth of sustainable economy and green labor market in South Dakota. The proposed ***Specialization*** is timely and important to several large efforts on battery and renewable energy in South Dakota and the battery industrial

development at Rapid City. The Center for Solid-State Electric Power Storage (CEPS), established in 2021 at South Dakota Mines, is backed by \$2.25 million in funding through the National Science Foundation's Industry-University Cooperative Research Centers (IUCRC) grant. The state of South Dakota supported this initiative and invested an additional \$3.9 million to establish the "Governor's Research Center for Electrochemical Energy Storage" that involves South Dakota Mines and South Dakota State University (SDSU). Just recently, AESir Technologies, a nickel zinc battery manufacturer, has selected Rapid City for a factory complex that could eventually employ up to 1,500 people. The curriculum of the proposed **Specialization** will help students enter the workforce for these sectors and other green economy related sectors. Additionally, The U.S. Bureau of Labor Statistics (BLS) projects significant job growth in green occupations that are related to helping the environment or conserving natural resources. ([https://www.bls.gov/careeroutlook/2018/data-on-display/green-growth.htm?view\\_full](https://www.bls.gov/careeroutlook/2018/data-on-display/green-growth.htm?view_full))

4. List the proposed curriculum for the specialization (including the requirements for completing the major – **highlight courses in the specialization**):

Prefix	Number	Course Title (add or delete rows as needed)	Credit Hours	New (yes, no)
		System General Education Goal 1, 2, 3, 4	21	No
		Math Requirement	11	No
		Physics Requirement	10	No
		Chemistry Core Curriculum	50	No
		Advanced Chemistry Electives (not required for the Green Chemistry Specialization)	0	No
		Free Electives	10	No
		<b>Green Chemistry Specialization Requirements:</b>		Choose an item.
Chem	482/582	Environmental Chemistry	3	No
Chem	462	Green Chemistry and Processes	3	No
Chem	480/580	Toxicology – Environment and Human Health	3	Yes
Chem	411/511	Electrochemical Energy Storage	3	Yes
CEE	425/525	Sustainable Engineering	3	No
		<i>Electives: Choose one of the five courses below for a total of 3 credits</i>		Choose an item.
Chem	426/526	Polymer Chemistry	3	No
Chem	485/585	Renewable & Sustainable Energy	3	No
Chem	420/520	Organic Chemistry III	3	No
CBE	455/556	Pollution Phenomena and Process Design	3	No
Biol	406/506	Global Environmental Change	3	No

Total number of hours required for completion of specialization

18

Total number of hours required for completion of major

88\*

Total number of hours required for completion of degree

120

\* 50 chemistry core credits + 10 free electives + 18 green chemistry specialization credits + 10 credits of math and physics courses beyond the Gen Ed. requirements.

**5. Delivery Location**

*Note: The accreditation requirements of the Higher Learning Commission (HLC) require Board approval for a university to offer programs off-campus and through distance delivery.*

**A. Complete the following charts to indicate if the university seeks authorization to deliver the entire program on campus, at any off campus location (e.g., UC Sioux Falls, Capital University Center, Black Hills State University-Rapid City, etc.) or deliver the entire specialization through distance technology (e.g., as an on-line program)?**

	Yes/No	Intended Start Date
<b>On campus</b>	Yes	Fall 2021

	Yes/No	If Yes, list location(s)	Intended Start Date
<b>Off campus</b>	No		Choose an item. Choose an item.

	Yes/No	If Yes, identify delivery methods <i>Delivery methods are defined in <a href="#">AAC Guideline 5.5</a>.</i>	Intended Start Date
<b>Distance Delivery (online/other distance delivery methods)</b>	No		Choose an item. Choose an item.

**B. Complete the following chart to indicate if the university seeks authorization to deliver more than 50% but less than 100% of the specialization through distance learning (e.g., as an on-line program)?** *This question responds to HLC definitions for distance delivery.*

	Yes/No	If Yes, identify delivery methods	Intended Start Date
<b>Distance Delivery (online/other distance delivery methods)</b>	No		Choose an item. Choose an item.

- 6. Additional Information:** *Additional information is optional. Use this space to provide pertinent information not requested above. Limit the number and length of additional attachments. Identify all attachments with capital letters. Letters of support are not necessary and are rarely included with Board materials. The University may include responses to questions from the Board or the Executive Director as appendices to the original proposal where applicable. Delete this item if not used.*

Requests for two new courses in Green Chemistry Specialization are attached.