

**ACADEMIC AFFAIRS COUNCIL**

**AGENDA ITEM: 4 – F (1)**

**DATE: April 22, 2020**

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**SUBJECT**

**Intent to Plan: SDSU MS in Pharmaceutical Sciences**

**CONTROLLING STATUTE, RULE, OR POLICY**

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

**BACKGROUND / DISCUSSION**

South Dakota State University (SDSU) requests authorization to develop a proposal to offer a Master of Science (MS) in Pharmaceutical Sciences. The pharmaceutical sciences include the biomedical sciences, medicinal chemistry, pharmacology, and pharmaceuticals. This interdisciplinary field of study prepares students for further education and/or careers in the pharmaceutical industry and regulatory agencies. This program will provide students with knowledge across all areas of the pharmaceutical sciences as well as research and technical expertise for future careers. Specifically, the need for a master’s program in pharmaceutical sciences is being driven by increased demand for master’s trained graduates by the pharmaceutical industry.

The M.S. program will be designed to prepare graduates to obtain positions in the pharmaceutical industry and regulatory agencies. Students who want to continue their education toward a Ph.D. can apply the M.S. program credits to the Ph.D. in Pharmaceutical Sciences currently offered by the department. The M.S. program in pharmaceutical sciences will be an attractive dual-degree option for professional pharmacy (Pharm.D.) students interested in research careers in the pharmaceutical industry and regulatory agencies. This multidisciplinary program will include courses and research training in the core pharmaceutical sciences disciplines of pharmacology, pharmaceuticals, medicinal chemistry, and biomedical sciences and pharmacogenomics. The M.S. program will prepare students for positions in the pharmaceutical industry, contract research organizations and regulatory agencies.

SDSU intends to offer the MS in Pharmaceutical Sciences both on campus and through distance delivery.

(Continued)

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**DRAFT MOTION**

Authorize SDSU to develop a program proposal for an MS in Pharmaceutical Sciences, as presented.

## **IMPACT AND RECOMMENDATION**

The University does not request new state resources. New course development is not anticipated. Courses currently offered as part of SDSU's Ph.D. in Pharmaceutical Sciences will be utilized for the proposed program.

The M.S. program expects to enroll five to ten students per year within the first five years and expects to graduate five to ten students per year after the first five years. The enrollment limitations are based on space, instrumentation, and faculty availability.

Board office staff recommends approval of the intent to plan with the following conditions:

1. The university will research existing curricula, consult with experts concerning the curriculum, and provide assurance in the proposal that the program is consistent with current national standards and with the needs of employers.
2. The proposal will define the specific knowledge, skills, and competencies to be acquired through the program, will outline how each will be obtained in the curriculum and will identify the specific measures to be used to determine whether individual students have attained the expected knowledge, skills, and competencies.
3. The university will not request new state resources without Board permission, and the program proposal will identify the sources and amounts of all funds needed to operate the program and the impact of reallocations on existing programs.

## **ATTACHMENTS**

Attachment I – Intent to Plan Form: SDSU – MS in Pharmaceutical Sciences



## SOUTH DAKOTA BOARD OF REGENTS ACADEMIC AFFAIRS FORMS

### Intent to Plan for a New Program

<b>UNIVERSITY:</b>	SDSU
<b>DEGREE(S) AND TITLE OF PROGRAM:</b>	M.S. in Pharmaceutical Sciences
<b>INTENDED DATE OF IMPLEMENTATION:</b>	2021-2022 Academic Year

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

- The individual preparing this request has read [AAC Guideline 2.4](#), which pertains to new intent to plan requests for new programs, 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 intent to plan, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.*

*Barry H. Dunn*

\_\_\_\_\_  
President of the University

3/27/2020

\_\_\_\_\_  
Date

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

South Dakota State University (SDSU) requests authorization to develop a proposal to offer a Master of Science in Pharmaceutical Sciences. The pharmaceutical sciences include the biomedical sciences, medicinal chemistry, pharmacology, and pharmaceuticals. This interdisciplinary field of study prepares students for further education and/or careers in the pharmaceutical industry and regulatory agencies. This program will provide students with knowledge across all areas of the pharmaceutical sciences as well as research and technical expertise for future careers. Specifically, the need for a master's program in pharmaceutical sciences is being driven by increased demand for master's trained graduates by the pharmaceutical industry.

The University does not request new state resources. New course development is not anticipated. Courses currently offered as part of SDSU's Ph.D. in Pharmaceutical Sciences will be utilized for the proposed program.

**2. What is the need for the proposed program (e.g., Regental system need, institutional need, workforce need, etc.)? What is the expected demand for graduates nationally and in South Dakota (provide data and examples; data sources 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.**

There is a workforce need for graduates with an M.S. in Pharmaceutical Sciences both nationally and regionally. Employment projections indicate growth in demand for those trained in the medical sciences. The Bureau of Labor Statistics projects 8% job growth from 2018-2028, which is higher than average.<sup>1</sup> The South Dakota Department of Labor and Regulations listed Chemical Manufacturing in their 2018 Workforce Report as the 6<sup>th</sup> fastest growing industry in South Dakota, specifically stating pharmaceutical and medical product developments as drivers of this growth. The growth rate is currently 12.8% and expected to remain in the double digits through at least 2026.<sup>2</sup> Further, the 2018 Biosciences Industry report indicates the drug and pharmaceutical subsectors as a rapid-growth area nationally (13.7%) while South Dakota's growth is outpacing the national average in new establishment and average annual wage growth (50% and 167.8%, respectively).<sup>3</sup> The South Dakota EPSCOR report on science and innovation strategies for the state projected 11% growth in jobs in the sciences related to human health and nutrition.<sup>4</sup> Recent trends in the pharmaceutical industry show increased demand for master's trained graduates compared to doctoral graduates. This is fueled by the growth in contract research organizations (CRO's), which prefer master's trained graduates given the nature of work performed by these organizations. Furthermore, the master's trained graduates will be able to meet the workforce needs of growing biotech start-ups in the region.

### **3. How would the proposed program benefit students?**

The M.S. program will be designed to prepare graduates to obtain positions in the pharmaceutical industry and regulatory agencies. Students who want to continue their education toward a Ph.D. can apply the M.S. program credits to the Ph.D. in Pharmaceutical Sciences currently offered by the department. The M.S. program in pharmaceutical sciences will be an attractive dual-degree option for professional pharmacy (Pharm.D.) students interested in research careers in the pharmaceutical industry and regulatory agencies. This multidisciplinary program will include courses and research training in the core pharmaceutical sciences disciplines of pharmacology, pharmaceuticals, medicinal chemistry, and biomedical sciences and pharmacogenomics. The M.S. program will prepare students for positions in the pharmaceutical industry, contract research organizations and regulatory agencies.

### **4. How does the proposed program relate to the university's mission as provided in South Dakota Statute and Board of Regents Policy, and to the current Board of Regents Strategic Plan 2014-2020?**

The M.S. in Pharmaceutical Sciences will support the statutory mission of South Dakota State University as provided by SDCL 13-58-1: *Designated as South Dakota's land grant university, South Dakota State University, formerly the state college of agriculture and mechanical arts, shall be under the control of the Board of Regents and shall provide undergraduate and graduate programs of instruction in the liberal arts and sciences and professional education in*

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<sup>1</sup> U.S. Bureau of Labor Statistics. <https://www.bls.gov/ooh/life-physical-and-social-science/medical-scientists.htm>.

<sup>2</sup> [https://dlr.sd.gov/lmic/publications/labor\\_market\\_reports/workforce\\_report\\_2018.pdf](https://dlr.sd.gov/lmic/publications/labor_market_reports/workforce_report_2018.pdf)

<sup>3</sup> [https://www.bio.org/sites/default/files/legacy/bioorg/docs/TEconomy\\_BIO\\_2018\\_Report.pdf](https://www.bio.org/sites/default/files/legacy/bioorg/docs/TEconomy_BIO_2018_Report.pdf)

<sup>4</sup> <https://sdepscor.org/sdepscorHome/wp-content/uploads/2015/07/2020-Vision.pdf>

*agriculture, education, engineering, home economics, nursing, and pharmacy, and other courses or programs as the Board of Regents may determine.*

The proposed program aligns with the goals stated in the South Dakota Board of Regents Strategic Plan 2014-2020. In particular, goal 3 – research and economic development will be supported by this program. The program will increase the number of graduates from STEM programs and contribute to the success of research and innovation in the pharmaceutical sciences.

In addition, the M.S. in Pharmaceutical Sciences will align with the mission and strategic plan of South Dakota State University.<sup>5</sup> Specifically, the program will feature student-centered education and research that will contribute to the health of South Dakota, the region, the nation, and the world. The program will contribute to attainment of strategic goal 1 – excellence through transformative education. This will be a distinct and high-quality academic program designed to meet student and market demands. It will also contribute to growth in research and scholarship of students and faculty (strategic goal 3).

- 5. Do any related programs exist at other public universities in South Dakota? If a related program already exists, explain the key differences between the existing programs and the proposed program, as well as the perceived need for adding the proposed new program. Would approval of the proposed new program create opportunities to collaborate with other South Dakota public universities? A list of existing system programs are available through the university websites and the [RIS Reporting: Academic Reports Database](#). If there are no related programs within the Regental system, enter “None.”**

None

- 6. Do related programs exist at public colleges and universities in Minnesota, North Dakota, Montana, and/or Wyoming? If a related program exists, enter the name of the institution and the title of the program; if no related program exists, enter “None” for that state. Add additional lines if there are more than two such programs in a state listed.**  
*This question addresses opportunities available through Minnesota Reciprocity and WICHE programs such as the Western Undergraduate Exchange and Western Regional Graduate Program in adjacent states. List only programs at the same degree level as the proposed program. For example, if the proposed program is a baccalaureate major, then list only related baccalaureate majors in the other states and do not include associate or graduate programs.*

Regional schools that offer a M.S. in Pharmaceutical Sciences include North Dakota State University, University of Nebraska Medical Center, Creighton University, and University of Montana. The University of Minnesota offers a master’s degree in pharmaceuticals but not in the multidisciplinary pharmaceutical sciences.

	<b>Institution</b>	<b>Program Title</b>
<b>Minnesota</b>	University of Minnesota	M.S. in Pharmaceutics
<b>North Dakota</b>	North Dakota State University	M.S. in Pharmaceutical Sciences
<b>Montana</b>	University of Montana	M.S. in Pharmaceutical Science and Drug Design
<b>Wyoming</b>	None	

<sup>5</sup> <https://www.sdstate.edu/imagine-2023-aspire-discover-achieve>

**7. Are students enrolling in this program expected to be new to the university or redirected from other existing programs at the university?**

It is anticipated that most students enrolled in the program will be new to the University. The program will also be an option for completion of a dual degree for students enrolled in the Pharm.D. program.

**8. What are the university’s expectations/estimates for enrollment in the program through the first five years? What are the university’s expectations/estimates for the annual number of graduates from the program after the first five years? Provide an explanation of the methodology the university used in developing these estimates.**

The M.S. program expects to enroll five to ten students per year within the first five years and expects to graduate five to ten students per year after the first five years. The enrollment limitations are based on space, instrumentation, and faculty availability.

**9. Complete the following charts to indicate if the university intends to seek 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 program through distance technology (e.g., as an on-line program)?**

*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.*

	Yes/No	Intended Start Date
<b>On campus</b>	Yes	2021-2022 Academic Year

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

	Yes/No	If Yes, identify delivery methods <i>Delivery methods are defined in AAC Guideline 5.5.</i>	Intended Start Date
<b>Distance Delivery (online/other distance delivery methods)</b>	Yes	015 - Internet Asynchronous– Term Based Instruction	2021-2022 Academic Year
<b>Does another BOR institution already have authorization to offer the program online?</b>	No	<b>If yes, identify institutions:</b>	

**10. What are the university’s plans for obtaining the resources needed to implement the program? Indicate “yes” or “no” in the columns below.**

	Development/ Start-up	Long-term Operation
Reallocate existing resources	Yes	Yes
Apply for external resources <i>If checking this box, please provide examples of the external funding identified below.</i>	No	No

	Development/ Start-up	Long-term Operation
Ask Board to seek new State resources <i>Note that requesting the Board to seek new State resources may require additional planning and is dependent upon the Board taking action to make the funding request part of their budget priorities. Universities intending to ask the Board for new State resources for a program should contact the Board office prior to submitting the intent to plan.</i>	No	No
Ask Board to approve a new or increased student fee	No	No

Courses currently offered by the Department for the Ph.D. students in Pharmaceutical Sciences will be open for students in the M.S. program. The Pharmaceutical Sciences Master's program will be supported by the tuition and fees generated from the program using the existing rates as shown below. Graduate research assistants (GRAs) supported through grants are eligible for tuition remission. For GRAs, the tuition will be charged to the grant.

Resident	\$336.80/cr. hr
Nonresident	\$647.55/cr. hr
Online Graduate	\$465.80/cr. hr
Delivery Fee (online graduate courses)	\$138.10/cr. hr

**11. Curriculum Example: Provide (as Appendix A) the curriculum of a similar program at another college or university. The Appendix should include required and elective courses in the program. Catalog pages or web materials are acceptable for inclusion. Identify the college or university and explain why the selected program is a model for the program under development.**

The curriculum for the M.S. in Pharmaceutical Sciences and Drug Design at the University of Montana can be found in Appendix A. This curriculum was selected because it is a general pharmaceutical sciences degree program, similar to the program proposed here. This example curriculum includes core courses in the pharmaceutical sciences (pharmacology, medicinal chemistry, and pharmacokinetics) plus statistics, seminar, and a topics course.

## **Appendix A**

### **Curriculum Example: University of Montana – M.S. in Pharmaceutical Sciences and Drug Design**

Additional information regarding the M.S. in Pharmaceutical Sciences and Drug Design may be found at: <http://health.umt.edu/biomed/graduate/biomedical-pharmaceutical-sciences/curriculum.php>

M.S. students are expected to complete degree training within two years. Degree requirements include:

#### **Core Courses:**

BMED 615 Molecular Pharmacology  
BMED 621 Medicinal Chemistry I - Drug Design, Development and Discovery  
BMED 632 Advanced Pharmacokinetics  
BMED 594 Seminar (information seminar)  
BMED 609 Biomedical Statistics  
BMED 637 Topics in Pharmaceutical Sciences and Drug Design (taken every semester of the program)  
BMED 597/599 Research/Thesis

#### **Research Rotations:**

Graduate students will rotate through the laboratories of at least two faculty members during their first year in the program, after which students will choose a faculty research advisor, advisory committee, and a thesis research project.

#### **Proposed Plan of Study for M.S. in Pharmaceutical Sciences and Drug Design:**

##### **Year 1:**

Core course work  
Research rotations  
Selection of research advisor  
Selection of advisory committee  
Approval of Plan of Study

##### **Year 2:**

Informational Seminar  
Approval of Research Proposal  
Preparation of manuscript submissions  
Thesis research and defense