



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

Intent to Plan for a New Program

UNIVERSITY:	SDSU
DEGREE(S) AND TITLE OF PROGRAM:	Professional Science Master's (PSM)
INTENDED DATE OF IMPLEMENTATION:	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.

President of the University

5/6/2020

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 Professional Science Master's (PSM). The Professional Science Master's is proposed as a collaboration between the Colleges of Natural Sciences and Agriculture, Food & Environmental Sciences and Ness School of Management & Economics. Professional Science Master's (PSMs) are designed for students who are seeking a graduate degree in science or mathematics and understand the need for developing workplace skills valued by top employers. PSM programs prepare students for science careers in business, government, or nonprofit organizations, where workforce needs are increasing.¹

The Professional Science Master's will fill an upper Great Plains gap for STEM and business-trained workforce members. This program will seek approval (similar to accreditation) from the National Professional Science Master's Association (NPSMA), and include the formation of an industry advisory board. Specializations and stackable graduate certificates will include Applied Physics, Bioprocessing/Biotechnology, Environmental Science, Food Technology, Physical Geography, Precision Agriculture, and Veterinary

¹ <https://www.professionalsciencemasters.org/about>

Business Administration.

The PSM would address a regional educational gap for science professionals wishing to obtain a high value credential and enhance their skill sets. This program would diversify the educational opportunities within the region and help drive economic development. The PSM aligns well with the mission and goals set forth in the SDSU strategic plan.

The University does not request new state resources. The specializations would be composed primarily of already existing graduate courses with adjustments for distance graduate students. SDSU would request a flat rate tuition for this 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.)?

The Professional Science Master's addresses project management skills, leadership and supervisory skills important toward enhancing the work force in non-academic settings.² Opportunities to study these skills at this level is a regional educational gap for science professionals wishing to obtain a high value credential and enhance their skill sets. This program would diversify the educational opportunities within the region and help drive economic development.

An online survey of alumni associated with science, technology, engineering, and mathematics programs for universities in the upper Midwest was conducted to determine demand.³ The majority of alumni respondents (66.6%) had earned only a bachelor's degree and 77.5% expected to eventually earn an advanced degree of some kind (master's – 47%, doctorate - 27%, other degree - 4%). The majority (72.5%) were not currently attending a college or university.

The majority of respondents (77.4%) were currently employed full-time in:

Science or technology field

- 69.7% science and technology field
- 13.9% not in a science and technology field, but would like to work in that field in the future

Place of work

- 38.8% private sector
- 17.3% academia
- 17.3% other
- 14.3% health care delivery

When asked about future career goals, the respondents provided the following information:

Future work sectors (respondents could select more than one option)

- 66 % private industry

² Cramer, J.M. and P.T. Hamilton. 2017. An internship may not be enough: Enhancing bioscience industry job readiness through practicum experiences. J. Microbial. & Biol. Educ. 18. doi:10.1128/jmbe.v18i1.1248

³ Alfred P. Sloan Foundation. 2011. Market Analysis and Feasibility Study of Professional Science Master's Degree Programs for Universities in the Upper Midwest.

- 36% government
- 35% academia
- 27 % consulting

Future type of work (respondents could select more than one option)

- 43% managerial work
- 29% development and production
- 29% research in industry
- 29% government
- 27% academia
- 28% consulting

When considering enrolling in a PSM program:

- 18% as full-time PSM student
- 34% as part-time student

Respondents rated the PSM degree more favorably than other advanced degrees. Sixty percent said they were either somewhat or very likely to pursue a PSM in the future. By comparison, only 48% said they were somewhat or very likely to pursue a traditional science master's, 43% were somewhat or very likely to pursue an MBA, 31% an advanced health-care degree, 30% a non-science master's degree, and 13% a master's of public administration. The majority of those interested in PSMs said they would likely pursue the degree part-time while working full time (57.6%). Only 7.8% said they would pursue the degree full-time without having outside employment.

The job outlooks for people who obtain a PSM are encouraging. Natural Sciences Managers is a category likely closest to the PSM in the U.S. Bureau of Labor Statistics Occupational Handbook⁴, and shows a 6% growth rate that is as fast as average. Many prospective students who would be attracted to this program would already be employed and benefit their career trajectories by obtaining this type of education. Key findings from the 2015/2016 Evaluation Report for Outcomes for PSM Alumni⁵ indicate:

- Overall, the PSM experience was found to be very effective for the respondents' professional development and career goals.
- 93% of the PSM graduates who responded to the survey attained their current jobs closely related to their master's degrees. The majority of the respondents currently work in business and industry.
- Base annual salary increased over time upon completion of the PSM program.

3. How would the proposed program benefit students?

Professional master's programs are playing an increasingly important role in preparing the future workforce and offering students an avenue to career pathways (Borchert, 2005, p.7⁶) Such programs have been characterized as being connected to the workplace by preparing students for entry level, career-oriented professional positions (Borchert, 2005 and Glazer-

⁴ <https://www.bls.gov/ooh/management/natural-sciences-managers.htm>

⁵ https://www.professionalsciencemasters.org/sites/default/files/outcomes_for_psm_alumni_2015-16.pdf

⁶ Borchert, M.A.E. (2005) *Master's education: A guide for faculty and administrators. A policy statement* (2nd ed.). Washington DC: Council of Graduate Students.

Raymo, 2005, p. 35⁷).

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

The PSM aligns with student success by offering a unique program for students that will increase the number of STEM degrees completed in the state. The program seeks approval similar to accreditation, aligning with quality and performance expectations. The program partners with industry and will lead to research and economic development as well as increasing the number of STEM graduates and potentially inspiring new STEM entrepreneurs in the state.

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?

None.

6. Do related programs exist at public colleges and universities in Minnesota, North Dakota, Montana, and/or Wyoming?

	Institution	Program Title
Minnesota	Minnesota State University, Mankato ⁸	Professional Science Master’s <ul style="list-style-type: none"> • Engineering Management • Geographic Information Sciences • Information Security and Risk Management
	University of Minnesota ⁹	Master of Financial Mathematics (MFM)
North Dakota	None	
Montana	None	
Wyoming	None	

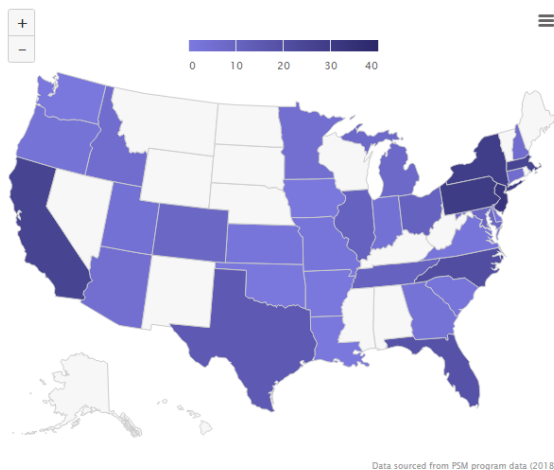
When looking at the national offerings of PSM programs, there is a gap in this region of the upper Great Plains (see map below).¹⁰

⁷ Glazer-Raymo, J.S. (2005). Professionalizing graduate education: The master’s degree in the market-place. *ASHE Higher Education Report*.

⁸ <http://www.mnsu.edu/psm/about.html>

⁹ <http://mcfam.math.umn.edu/>

¹⁰ <https://www.professionalsciencemasters.org/psm-programs-state>



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

The University anticipates students enrolling in the Professional Science Master’s are expected to be undergraduates continuing onto a graduate degree and those already employed (new or returning to the university).

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 University conservatively anticipates enrolling between 15-20 students and producing 4-5 graduates per year within five years. The numbers may be higher as the biotechnology and bioprocessing sectors expand in the state.

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
On campus	Yes	2021-2022 Academic Year

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

	Yes/No	If Yes, identify delivery methods Delivery methods are defined in AAC Guideline 5.5.	Intended Start Date
Distance Delivery (online/other distance delivery methods)	Yes	015 - Internet Asynchronous– Term Based Instruction; 018 - Internet Synchronous	2021-2022 Academic Year

	Yes/No	If Yes, identify delivery methods Delivery methods are defined in AAC Guideline 5.5 .	Intended Start Date
Does another BOR institution already have authorization to offer the program online?	No	If yes, identify institutions:	

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>	Yes	Yes
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	Yes	Yes

The specializations would be composed primarily of already existing graduate courses with adjustments for distance graduate students. SDSU would request a flat rate tuition for this program.

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.

Appendix A contains an example of a similar program at Kansas State University-Olathe. This curriculum was selected because it is a PSM similar to the program proposed here. This example includes a stackable curriculum that will allow students to build their program. SDSU’s Professional Science Master’s program will have more specialization and certificate options, but the concept is very similar.

Appendix A

Curriculum Example: Kansas State University-Olathe

Additional information regarding the Professional Science Master's may be found at:

<https://olathe.k-state.edu/academics/degrees/psm/>



Flexible course schedule

The Professional Science Master's (PSM) degree is tailored for students. Students in the program choose from classes that align with their interests and career goals. Courses can be taken online, at K-State Olathe campus or as a combination.

Build your degree

To earn a PSM, a student must complete 30 total credits, including:

- 15 credits of STEM courses
- 12 credits of professional skills courses
- 3 credits of Capstone courses

Professional skills courses

- Interdisciplinary Process
- Regulatory Aspects of Vaccine Development in Animal Health
- Project Management
- Managerial Finances, Metrics and Analytics
- Informatics and Technology Management
- Multidisciplinary Thought and Presentation
- Trade and Agricultural Health
- Globalization, Cooperation and Food Trade
- Interpersonal and Intrapersonal Dynamics
- Leading Adults in a Globalized Diverse World
- Developing Teams and Leaders
- Group Dynamics
- Seminars in Adult Education

Capstone course

- Capstone Experiences

STEM courses

- Meat Selection and Utilization
- Monogastric Nutrition
- Equine Nutrition
- Meat Industry Technology
- Biological and Agricultural Engineering
- One Health
- Epidemiology
- Environmental Health
- Global Health Issues
- Pathobiology
- Vaccinology
- Zoonotic Pathogens in the Food Chain
- Food Microbiology
- Food Microbiology Lab
- Problems in Food Science
- HACCP
- Quality Assurance of Food Products
- Consumer Research Fundamentals
- Qualitative Consumer Research
- Quantitative Consumer Research
- Postharvest Technology and Physiology of Horticultural Crops
- Health-Promoting Phytochemicals and Physiology of Fruits and Vegetables
- Sustainable Agriculture
- Urban Agriculture
- Farm to Fork Produce Safety
- Urban Food Systems
- Urban Agriculture Study Tour
- Biostatistics
- Statistical Methods for the Sciences
- Statistical Modeling

More information

Learn more and encourage employees to apply at
olathe.k-state.edu/psm

KANSAS STATE
UNIVERSITY | Olathe