REQUEST TO PLAN MEMORANDUM

DATE: February 3, 2022

TO: Chief Academic Officers, Montana University System

FROM: Brock Tessman, Deputy Commissioner for Academic, Research, and Student Affairs

RE: March 2022 Request to Plan Proposals

The campuses of the Montana University System have proposed new academic programs or changes under the Request to Plan process authorized by the Montana Board of Regents. The proposals are being sent to you for your review and approval. If you have concerns about a particular proposal, you should share those concerns with your colleagues at that institution and try to come to some understanding. If you cannot resolve your concerns, raise them at the Chief Academic Officer's conference call February 16th. Issues not resolved at that meeting should be submitted in writing to OCHE by noon on Friday, February 18th. If no concerns are received, OCHE will assume that the proposals have your approval.

Requests to Plan

Montana State University Bozeman:

- Request to plan a B.S. in Data Science
  Item # 199-2010-LI0122

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ITEM 2010-LI0122 **Meeting Date: January, 2022**

Item Name: Request authorization to plan a Bachelor of Science in Data Science

Program/Center/Institute Title: **Bachelor of Science in Data Science** Planned 6-digit CIP code: **30.7001**

Campus, School/Department: **MSU, Gianforte School of Computing** Expected Final Submission Date: **Spring 2022**

Contact Name/Info: **John Paxton, john.paxton@montana.edu, 406-994-5979**

This form is meant to increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process. The completed form should not be more than 2-3 pages. For more information regarding the program/center/institute approval process, please visit http://mus.edu/che/arsa/academicproposals.asp.

1) **Provide a description of the program/center/institute.**

The proposal seeks to authorize a 120-credit B.S. in Data Science at Montana State University that includes coursework from Computer Science, Statistics, Mathematics, Business, English and the MSU Library. Data Science is an interdisciplinary field that extracts knowledge and insights from diverse data. The major would be developed and administered within MSU's School of Computing in close collaboration with the Department of Mathematical Sciences.

2) **Describe the need for the program/center/institute. Specifically, how the program/center/institute meets current student, state, and workforce demands. (Please cite sources).**

Nationwide, according to the Bureau of Labor Statistics, employment of computer and information scientists (that includes data scientists) is projected to rise by 22% from 2020 to 2030 in comparison to 8% for all occupations. In Montana, a 2021 University of Montana Bureau of Business and Economic Research report shows that members of the Montana High Tech Business Alliance expect to add 1,500 new jobs in 2021. Many of these jobs will be enhanced by data science skills.

3) **Describe any significant new resources (financial, staff, facility, new curricula) needed to launch and sustain the program/center/institute.**

A Data Science degree could attract as many as 50 majors per year. Half of these students might be students who would have previously declared Computer Science, Mathematics or Statistics as a major. The other half might be new students who the university attracts. The following resources are anticipated:

- Support to teach two new courses each year: a data science capstone course and a course on the ethics of big data.
- Support to teach additional sections of existing courses. If the number of data science majors who enroll in required or elective courses is large enough, additional sections of those courses will be needed.

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- Possible support to advise Data Science majors. If the number of Data Science majors is large enough, a dedicated advisor would serve students well due to the interdisciplinary nature of the degree.

4) Describe any efforts or opportunities you have identified for collaboration either within the institution or between MUS institutions (i.e. articulation, course-sharing, research collaboration).

Data Science is a highly interdisciplinary area. Although the School of Computing and Department of Mathematical Sciences will offer the bulk of the required courses and collaborate on the capstone, the degree will also require two courses from the College of Business, one course from the MSU Library and one course from the English Department. In addition, the degree will provide a student with 18-credits of elective coursework that enables an application area of data science (in the social sciences, in the natural sciences, in agriculture, etc.) to be pursued. Note: the proposed curriculum has been developed in collaboration with all of the above mentioned academic units.

Within Montana, Montana Tech is the only university to currently offer a Data Science B.S. The degree we are proposing is similar to Montana Tech's Data Science degree in that the bulk of the required courses come from computer science, mathematics and statistics. There are many courses that are unique to each university's requirements. For example, we will require the following unique courses: BMIS 211 (Data Analytics I), BMIS 311 (Management Information Sessions), CSCI 440 (Database Systems), STAT 411 (Methods for Data Analysis I), STAT 412 (Methods for Data Analysis II) and LSCI 470 (Ethics & Privacy in the Big Data Age). Conversely, there are many courses that Montana Tech requires that our proposal does not. One final difference is that our degree provides 18 credits of free electives for a student to pursue a data science area of interest (such as precision agriculture or sociology) whereas Montana Tech provides 12 credits of free electives. Recent enrollments in Montana Tech's Data Science B.S. program have grown steadily from 5 in the inaugural year (2017-2018) to 13 (2020-2021).

The University of Montana offers two data science related opportunities: a Masters in Business Analytics and an undergraduate certificate in the area of Big Data Analytics.

Our proposed Data Science B.S. curriculum has been shared with Montana Tech's Computer Science Department Head (Michele Van Dyne) and the University of Montana's Computer Science Department Chair (Jesse Johnson).

5) Describe how the program/center/institute fits with the institutional mission, strategic plan, existing institutional program array, and academic priorities as described in the most recent Academic Priorities and Planning Statement.

Montana State University already offers a Data Science M.S. degree and a Data Science minor. The Data Science B.S. is the next step in expanding MSU's Data Science offerings and the degree appears in a previously approved Intent to Plan document. In today's world, students at every university benefit greatly from the opportunities that arise by gaining data science skills and knowledge.

The Data Science B.S. is interdisciplinary, requiring coursework from Computer Science, Mathematics, Statistics, Business, the MSU Library, and English. The ability to understand data and deal with large data sets is increasingly vital in disciplines such as healthcare, precision agriculture, business analytics, and engineering. The proposed

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Data Science B.S. provide students with knowledge and skills related to data, modeling, and computation. It contributes to the MSU Academic Priority Plan and MSU's 2019 Choosing Promise strategic plan as follows:

- **Goal 2.2: Expand Interdisciplinary Scholarship.** The Data Science B.S. will involve faculty from across the university. Furthermore, the capstone course will enable students to apply their data science skills to an application area of interest (such as precision agriculture), further connecting faculty with data science knowledge and needs. As faculty work with other faculty from across the university, new connections will be forged that lead to new research collaborations.

- **Goal 3.2: Grow Mutually Beneficial Partnerships Across Montana**. According to a 2021 University of Montana Bureau of Business and Economic Research report, members of the Montana High Tech Business Alliance expect to add 1,500 new jobs in 2021. A larger workforce with data science skills and knowledge is needed by Montana's high-tech industry and will accelerate economic development in the state of Montana.

Signature/Date		
Chief Academic Officer:	DocuSigned by: Robert Mokwa 212A28411AC04BD...	1/28/2022 | 11:39 AM MST
Chief Research Officer*:		
Chief Executive Officer:	DocuSigned by: 7D6A4CE96C3F415...	1/28/2022 | 11:39 AM MST
Flagship Provost:**	DocuSigned by: Robert Mokwa 212A28411AC04BD...	1/28/2022 | 11:39 AM MST
Flagship President:**	DocuSigned by: 7D6A4CE96C3F415...	1/28/2022 | 11:39 AM MST

*Center/Institute Proposal only
**Not applicable to the Community Colleges.