

LEVEL II MEMORANDUM

DATE: April 3, 2020

TO: Chief Academic Officers, Montana University System

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

RE: May 2020 Level II Proposals

The campuses of the Montana University System have proposed new academic programs or changes under the Level II approval process authorized by the Montana Board of Regents. The Level II 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 May 6th. Issues not resolved at that meeting should be submitted in writing to OCHE by noon on Friday, May 8th. If no concerns are received, OCHE will assume that the proposals have your approval.

Level II Items

Montana State University Bozeman:

- Request to offer a Master of Science of Innovation and Management
[Item # 188-2010-R0520](#) | [Request Form](#) | [Curriculum Form](#) | [Fiscal Form](#) | [Intent to Plan](#)
- Request authorization to separately name PhD in Mechanical Engineering
[Item # 188-2011-R0520](#) | [Request Form](#) | [Curriculum Form](#) | [Fiscal Form](#) | [Intent to Plan](#)

The University of Montana Missoula:

- Request for authorization to establish options in Software Engineering, Data Science, and Algorithm Design in the Computer Science B.S. and offer blended delivery of the program.
[Item #188-1001-R0520](#) | [Curriculum Form](#) | [Fiscal Form](#) | [Intent to Plan](#)
- Request for authorization to establish a B.F.A. in Creative Writing
[Item #188-1002-R0520](#) | [Curriculum Form](#) | [Fiscal Form](#) | [Intent to Plan](#)
- Request for authorization to establish a B.A. in World Languages and Cultures and establish blended delivery
[Item #188-1002-R0520](#) | [Curriculum Form](#) | [Fiscal Form](#) | [Intent to Plan](#)

Montana Technological University:

- Request to establish a Statistics option in the B.S. in Mathematics
[Item # 188-1501-R0120](#) | [Request Form](#) | [Curriculum Form](#) | [Fiscal Form](#) | [Intent to Plan](#)
- Request to rename the Department of Business and Information Technology to the Department of Business
[Item # 188-1507-R0520](#)
- Request to rename the Liberal Studies Department to the Department of Interdisciplinary Arts and Sciences
[Item # 188-1507-R0520](#)

May 20-21,2020

ITEM 188-2010-R0520

Item Name:

Request authorization to offer a Master of Science of Innovation and Management

THAT

The Board of Regents of the Montana University System approves Montana State University/ Jake Jabs College of Business and Entrepreneurship creating a new graduate program.

EXPLANATION

We propose a new 1-year, 30 credit professional master's degree, targeted at graduating engineering and STEM seniors to provide entrepreneurial and leadership skills

ATTACHMENTS

- Academic Request Form
- Curriculum Proposal Form
- Fiscal Analysis
- Intent to Plan

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

ITEM 188-2010-R0520 Submission Month or Meeting: May 20-21,2020

Institution: Montana State University CIP Code: 52.0701

Program/Center/Institute Title: Master of Science of Innovation and Management / Jabs / MSU

Includes (please specify below): Online Offering _____ Options _____

Please mark the appropriate type of request and submit with an Item Template and any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/academicproposals.asp>.

 A. Level I:

Campus Approvals

- 1a. Placing a postsecondary educational program into moratorium** (Program Termination and Moratorium Form)
- 1b. Withdrawing a postsecondary educational program from moratorium**
- 2. Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less**
- 3. Establishing a B.A.S./A.A./A.S. area of study**
- 4. Offering an existing postsecondary educational program via distance or online delivery**

OCHE Approvals

- 5. Re-titling an existing postsecondary educational program**
- 6. Terminating an existing postsecondary educational program** (Program Termination and Moratorium Form)
- 7. Consolidating existing postsecondary educational programs** (Curriculum Proposal Form)
- 8. Establishing a new minor where there is a major or an option in a major** (Curriculum Proposal Form)
- 9. Revising a postsecondary educational program** (Curriculum Proposal Form)
- 10. Establishing a temporary C.A.S. or A.A.S. degree program** *Approval limited to 2 years*

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B. Level II:

- X** 1. **Establishing a new postsecondary educational program** (Curriculum Proposal and Completed Intent to Plan Form)
2. **Permanent authorization for a temporary C.A.S. or A.A.S degree program** (Curriculum Proposal and Completed Intent to Plan Form)
3. **Exceeding the 120 credit maximum for baccalaureate degrees** *Exception to policy 301.11*
4. **Forming, eliminating or consolidating an academic, administrative, or research unit** (Curriculum or Center/Institute Proposal and Completed Intent to Plan Form, except when eliminating or consolidating)
5. **Re-titling an academic, administrative, or research unit**

Proposal Summary [360 words maximum]

What:

The Master of Science in Innovation and Management (MSIM) is a 30-credit, one-year, graduate program, designed specifically for recent Engineering and STEM graduates. The program provides these early-stage professionals with a set of skills that will enable them to be more effective leaders, innovators, and team members in their respective careers.

Why

Current Engineering and STEM degrees are highly prescribed and technical which prevent these exceptionally bright students from learning many of the skills that are necessary to succeed as leaders and innovators in industry.

Resources

Human capital. We will hire a program director and NTT faculty in the early years. With growth of the program, the college will expect an additional TT line in later years.

Relationship to similar MUS programs

There are no directly similar programs in the MUS system. The closest program is the 2-year, MBA program offered by UM, which provides general business curriculum that is less targeted for recent Engineering and STEM graduates.

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CURRICULUM PROPOSAL FORM

- 1. Overview of the request and resulting changes.** Provide a one-paragraph description of the proposed program. Will this program be related or tied to other programs on campus? Describe any changes to existing program(s) that this program will replace or modify. *[100 words]*

The Master of Science of Innovation and Management is a 30-credit, non-thesis master's program, designed as a 5th year program for our STEM students. The goal of the program is to provide these early stage professionals with a set of skills that will enable them to be more effective leaders, innovators and team members in their respective careers. The program leverages a highly experiential learning approach that leverages the entrepreneurial process as a learning vehicle for the critical business and leadership skills that are necessary to successfully launch a new company or lead a team within a larger enterprise.

- 2. Relation to institutional strategic goals.** Describe the nature and purpose of the new program in the context of the institution's mission and core themes. *[200 words]*

With its focus on recent STEM (Science, Technology, Engineering, and Mathematics) graduates, this program will enable MSU graduates in those fields to complete a one-year program to develop their professional skills. A unique component of the MSIM program will be its partnership with the Montana State University Tech Transfer office and TechLink. As part of the program, the students will be introduced to the compelling research and intellectual property that is available as part of the Dept of Defense's research initiatives as well as the \$138 million of research conducted by MSU faculty each year. Armed with the vast trove of intellectual property as a starting point, the students in the MSIM program will create teams that will develop full business plans based on and pursue the commercial success of these inventions. Alternatively, the student teams will have the option of pursuing business ideas that are independent of these technology transfer offices.

The MSIM program is tightly aligned with MSU's Choosing Promise strategic plan.

Strategic Goals:

- Strategic Goal 1.2: Expand high quality graduate education
- Strategic Goal 2.1.3: The MSIM program will drive enhanced graduate education through increased participation in entrepreneurial activities.
- Strategic Goal 3.3.4: The MSIM program is a new academic program that is tailored to Montana's economic need of entrepreneurial activities
- Strategic Goal 3.3.1: The MSIM program will rely on tight collaboration between the Tech Transfer Office, the Launchpad, and our alumni network to support its academic objective

More specifically tied to the Jake Jobs College of Business and Entrepreneurship, this program builds on our mission of Inspiring Creativity, Innovation and Growth.

- 3. Process leading to submission.** Briefly detail the planning, development, and approval process of the program at the institution. *[100 words]*

The proposed program was introduced to the Strategic Initiatives Committee in the JJCBE and separately to the JJCBE faculty at two faculty meetings during the 2018 -2019 AY. A focused team of faculty advanced the program proposal during the spring, 2019. The program was discussed in a Jobs college retreat in August 2019 and in subsequent break-out sessions. The college voted 32 to 0 with 2 abstentions to approve the program proposal in late August 2019. The graduate council reviewed the proposal during the fall of 2019 and approved

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in December. The college reviewed the updated and revised program proposal during its January retreat. MSU faculty senate reviewed and approved the program in January 2020.

4. Program description. Please include a complete listing of the proposed new curriculum in Appendix A of this document.

a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program	24
Credits in required courses offered by other departments	0
Credits in institutional general education curriculum	0
Credits of free electives	6
Total credits required to complete the program	30

b. List the program learning outcomes for the proposed program. Use learner-centered statements that indicate what students will know, be able to do, and/or value or appreciate as a result of completing the program.

Upon completion of the MS in Innovation Management, students will be able to:

- Assess market viability for a new product and/or a new company
- Assess and model financial viability for a new product and/or a new company
- Rapidly prototype and iterate a new product concept or design
- Conduct market research to validate critical strategic assumptions
- Write and present a comprehensive business plan to a venture or corporate investor
- Lead teams and communicate effectively

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5. **Need for the program.** To what specific student, regional, and statewide needs is the institution responding to with the proposed program? How will the proposed program meet those needs? Consider workforce, student, economic, societal, and transfer needs in your response as appropriate. [250 words]

A 2013 study by the National Science Foundation (NSF) suggests a disconnect between skills desired by employers and professional development provided in STEM programs [National Science Foundation (NSF), 2013a]. Employers from diverse sectors expect STEM degree holders to have expert content knowledge, strong communication skills, a multidisciplinary focus, entrepreneurial and project management skills, a sense of professionalism, and the ability to apply knowledge across a broad context [Council of Graduate Schools and Educational Testing Service, 2012].

The US Department of Labor is forecasting almost 168,000 job openings in STEM-related management roles by 2024 (Bureau of Labor Statistics Report, 2017).

Despite employer expectations and projected increase in available opportunities, the NSF study indicates that today's STEM programs still leave critical gaps in skills focused on science communication, preparation for nonacademic careers, broadening the societal relevance of research (e.g., engaging nonscience audiences, policy makers, and stakeholders through outreach), and entrepreneurship.

The genesis of the MSIM program relates to the current challenges faced by many young STEM professionals, as they enter the workforce. The rigors of their undergraduate programs often leave these recent graduates with strong technical and analytical skills but underprepared for many of the managerial, organizational, and entrepreneurial challenges that they face as they enter the workforce.

We have also validated demand from hiring companies through a survey of our engineering board of advisors, which is comprised of executives at potential hiring companies for these graduates. Of these board members, 90% expressed a desire for their new hires to have these skills, 75% would give preference to hiring these students over others without this degree and over 70% expect to pay a premium for new hires with this degree.

6. **Similar programs.** Use the table below to identify and describe the relationship between any similar programs within the Montana University System.

Institution Name	Degree	Program Title
UM	MBA	Master of Business Administration

- a. If the proposed program substantially duplicates another program offered in the Montana University System, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. [200 words]

The MSIM program is substantially different from the MBA program offered at University of Montana.

The MSIM program is targeted specifically to STEM students, whereas the MBA program at UM has no particular focus of undergraduate study.

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- The MSIM program has a particular emphasis on innovation and the entrepreneurial experience, whereas the MBA program at UM is a traditional MBA program.

- b. Describe any efforts that were made to collaborate with similar programs at other institutions. If no efforts were made, please explain why. *[200 words]*

Given that the MSIM program is being designed as a cohort program, with 100% of the educational content being delivered in the classroom, with a heavy emphasis on experiential learning, we do not see an obvious opportunity to partner with other programs across the MUS system to deliver this degree. We do expect heavy collaboration across colleges at MSU.

- 7. Implementation of the program.** When will the program be first offered? If implementation will occur in phases, please describe the phased implementation plans. *[100 words]*

- a. Complete the following table indicating the projected enrollments in and graduates from the proposed program.

Fall Headcount Enrollment				Graduates			
AY 20-21	AY 21-22	AY 22-23	AY 23-24	AY 20-21	AY 21-22	AY 22-23	AY 23-24
0	25	35	50	0	25	35	50

- b. Describe the methodology and sources for determining the enrollment and graduation projections above. *[200 words]*

We expect a 100% graduation rate in this program, with an estimate of 80% of the students graduating in one-year, with the additional 20% choosing to extend the program into a 3rd semester. Our projections for graduation rates are pulled from discussions with the MEMPC (Master of Engineering Management Program Consortium). The MEMPC is comprised of 9 of the most recognized MEM programs in the US.

- c. What is the initial capacity for the program?

We would like to restrict the first-year cohort to 30 students. We believe we can support up to 50 students in a single cohort. Beyond 50 students, we will begin to split sections to maintain a highly collaborative learning experience.

- 8. Program assessment.** How will success of the program be determined? What action would result if this definition of success is not met? *[150 words]*

We believe there are several metrics that will help us measure the success of our program. The key metrics include the following:

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- Student Enrollment
- Student Satisfaction
- Employment Placement
- MSIM Salary level vs. comparable students without a master's degree
- Number of New start-ups launched by students
- Employer Satisfaction

- a. Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program. When will assessment activities occur and at what frequency? *[150 words]*

Students will be assessed individually at the course level as well as during the end of semester presentations of their business plans.

- b. What direct and indirect measures will be used to assess student learning? *[100 words]*

Students will be presenting their business plans at the end of both the fall and spring semester. This will offer a natural opportunity to assess the development of the students as they iterate and advance their knowledge of business and their integration of their coursework into a cumulative project.

- c. How will you ensure that the assessment findings will be used to ensure the quality of the program? *[100 words]*

Assessment findings will be reviewed by our AOL committee. The Director of the program will present program assessment outcomes and program improvements to the college's leadership team on an annual basis.

- d. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation. *[100 words]*

AACSB allows for MEM programs to be accredited but does not specifically require business schools to include these programs in their overall accreditation process. We intend to submit the MSIM for accreditation during our 2026 review. The accreditation process will be identical to our existing process for both our undergraduate program and our existing MPAC program.

9. Physical resources.

- a. Describe the existing facilities, equipment, space, laboratory instruments, computer(s), or other physical equipment available to support the successful implementation of the program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated? *[200 words]*

Our college is fortunate to have a dedicated collaborative learning space that was designed to support a program like the MSIM. This space will be allocated specifically to the MSIM program. As a result, no other learning spaces will be affected. In absence of a collaborative program such as the MSIM, this space has been used as a substitute for a normal classroom during the past 5 years. As a result, we will

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shift a few classes from this learning space into other classrooms on campus. While space is currently a rare commodity on campus during our prime teaching hours, the new academic spaces being constructed in Romney Hall will provide new flexibility. We also have opportunities to extend our teaching hours into the early evening as well as schedule more classes on Fridays.

- b. List needed facilities, equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. (Enter the costs of those physical resources into the budget sheet.) How will the need for these additional resources be met? *[150 words]*

We do not foresee any new / unique equipment or facilities required for this program.

10. Personnel resources.

- a. Describe the existing instructional, support, and administrative resources available to support the successful implementation of the program. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained? *[200 words]*

Our college has a rich set of resources that will be leveraged to support this new program. Our Bracken Center for student success will provide career services. Our office of student services can support any academic advising needs that are not addressed by the Director of the program. Several of our existing Tenure Track faculty are capable of teaching in this new program. We do not expect any negative impacts on the quality of our existing programs as a result of this new program. The new NTT faculty we hire will either be leveraged in the new MSIM program, or will be used to teach in our undergraduate program, whereby they will free up existing TT faculty to teach in the new graduate program.

- b. Identify new personnel that must be hired to support the proposed program. (Enter the costs of those personnel resources into the budget sheet.) What are the anticipated sources or plans to secure the needed qualified faculty and staff? *[150 words]*

We will hire a Director to lead the program and be active as an advisor and faculty member in the new program. We will also hire new NTT faculty with extensive industry experience to teach several of the courses. We have several experienced and qualified NTT faculty who we feel may apply for the Director position, yet we will conduct an extensive search for the new Director in order to ensure that we are hiring the most qualified candidate. We are fortunate to have a large pool of highly experienced and successful entrepreneurs and executives who live in the greater Bozeman area. Given this rich pool of talent, we do not foresee any challenges with hiring new NTT faculty to support this program.

In later years, we hope to secure new tenure track faculty to support the growth of the program.

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11. Other resources.

- a. Are the available library and information resources adequate for the proposed program? If not, how will adequate resources be obtained? *[100 words]*

No new library or information resources will be required.

- b. Do existing student services have the capacity to accommodate the proposed program? What are the implications of the new program on services for the rest of the student body? *[150 words]*

Jabs is fortunate to have the Bracken Center, an endowed resource for student engagement and career development. Between our existing Career Services dept at MSU and our own dedicated resource within Jabs, we believe we have enough resources available to support all career services. We expect a significant overlap for potential hiring firms for graduates of our MSIM program with companies who already actively recruit at MSU.

Jabs has an internal marketing resource to help support our recruiting efforts. We will also coordinate our efforts with the Graduate School and MSU Admissions.

The Director of the program will provide student advising.

12. Revenues and expenditures. Describe the implications of the new program on the financial situation of the institution. *[100 words]*

- a. Please complete the following table of budget projections using the corresponding information from the fiscal analysis form for the first three years of operation of the new program.

	Year 1	Year 2	Year 3
Revenues	\$443,218	\$651,778	\$1,021,140
Expenses	\$243,940	\$256,418	\$462,774
Net Income/Deficit (revenues-expenses)	\$208,278	\$395,360	\$558,366

- b. Describe any expenses anticipated with the implementation of the new program. How will these expenses be met? *[200 words]*
- i. If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs? *[150 words]*

We will not need to reallocate any existing state appropriated funding. Student tuition will cover the expense of running this program. In the early years, we will add new NTT faculty in the college

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to support the new program. Some of these NTT's will teach courses in the new program and others will be used to backfill Tenure Track faculty who are currently teaching in our other programs – allowing our TT faculty to participate in our new program. The upfront marketing costs and curriculum development costs will be covered through Foundation accounts.

- ii. If an increase in base funding is required to fund the program, indicate the amount of additional base funding and the fiscal year when the institution plans to include the base funding in the department's budget.
 - Revenue from tuition will more than cover the required increases in spending.
 - We will request new base funding to support the program Director and new faculty as the program expands.
- iii. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? *[150 words]*

Jabs has a few Foundation accounts that can be leveraged for strategic investments in the college. These funds already exist and will be used to offset our initial marketing costs for the program.

- iv. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? *[150 words]*

13. Student fees. If the proposed program intends to impose new course, class, lab, or program fees, please list the type and amount of the fee.

14. Complete the fiscal analysis form.

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Signature/Date

College or School Dean:



Chief Academic Officer:

D. L. Mohr 2-25-20

Chief Executive Officer:

Jeffrey Adams Feb 27, 2020

Flagship Provost*:

D. L. Mohr 2-25-20

Flagship President*:

Jeffrey Adams Feb 27, 2020

*Not applicable to the Community Colleges.

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Appendix A – Proposed New Curriculum

The MSIM program is a 30-credit, non-thesis master’s degree taught in a cohort model. Jabs will dedicate one of its collaborative learning spaces (Jabs 207) to the program. The students will work out of this space for the duration of their program at MSU. Each class will be taught in the Jabs 207, and the students will be allocated space within the room for their break-out teamwork.

As a result of the cohort model and the strong experiential learning aspect of the program, most of the classes for the degree will be required, leaving 6 credits available to the students as electives. Students will have the option of completing the degree in 2-semester, 2-semester plus a summer capstone or in 3 semesters. We believe our international students will elect to extend their course of study for the full 3 semesters, whereas many of our MSU students will elect to complete the degree in a single academic year. MSU students will be allowed to reserve up to 6 credits of graduate-level classes from their undergraduate degree into the program.

New required courses that will be part of the MSIM program include:

Fall Semester: 13 Credits taught within the cohort model

51XX Innovation and Product Introduction: 3- Credits

- Students begin the course by learning market research, customer input, and consumer behavior. Interdisciplinary teams will integrate with learning from other first-semester courses for the development of a new product concept, identification of target markets, assessment of competing products, and identifying distribution channels. The student teams formally present their concepts at the end of the semester and develop effective techniques to present to senior management and/or prospective investors.

51XX Finance for Entrepreneurs: 3-Credits

- Finance for Entrepreneurs is focused on analyzing the financial aspects of a new venture. Emphasis is on financial forecasting and access to funding. Topics include strategic financing, financing alternatives, financial contracting, venture valuation, cash flow projection, capital budgeting, capital structure, and risk-sharing. The course revolves around cases and culminates in a capstone project consisting of a complete business plan for an innovative new product or service.

51XX Marketing, Branding, and Communications: 3-Credits

- This course is focused on developing marketing strategy, branding, positioning, messaging, and driving implementation of marketing programs for a variety of ventures. Students define successful branding strategies and make and implement action plans based on strategic marketing. The course will emphasize communicating through dynamic oral presentations and clear and concise writing for a variety of audiences.

51XX Leadership in Business: 3-Credits

- Students learn the basic concepts of leadership, management, and teamwork. The course will introduce concepts such as motivation, leadership, teamwork, organizational design, and diversity. Students will learn the impact of personality styles, the essentials of emotional competence, and the value of self-awareness. Leadership and cognitive styles will be covered, and cognitive biases will be introduced, demonstrated, and

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discussed. Practical skills will be developed in giving and receiving feedback, fostering individual and team creativity, and communicating to inspire and influence without authority.

51XX Innovation Sprint One: 1-Credit

- The Sprint Lab is a collaborative update session where student teams each share the progress they've made on the Sprint projects, discuss challenges, brainstorm new ideas and solutions, and get feedback and coaching along the way from faculty and each other.

Spring Semester: 11-Credits taught within the cohort model

51XX Business Data Analytics 3-Credits

- This course emphasizes the practical application of information technology to improve business efficiency and effectiveness. The course emphasizes both analyses of raw data and introduction to common business data analysis platforms. Descriptive, predictive, and prescriptive analytics will be covered, along with practical exercises.

51XX Innovation in the Technology Sector and Beyond 3-Credits

- Students gain the skills to lead technological innovation both within the technology sector and in a wide variety of other industries. The focus will be on Montana-based industries, ranging from photonics to software development to recreation to energy to land resources. Topics include understanding intellectual property and the role of technological innovation in entrepreneurial ventures as well as in established firms. Emphasis on presenting new product proposals to senior management and/or prospective investors.

51XX Business, Government, and Society 3-Credits

- This interdisciplinary course deals with the relationship between business and government, as well as the importance of corporate social responsibility and the role of ethical decision making. The course introduces basic business law but also emphasizes ethical behavior above and beyond legal requirements. The course will address a business' impact on a variety of stakeholder groups, including shareholders, customers, employees, and communities. The role of government regulation will be addressed, as well as the associated trade-offs in a market-based economy.

51XX Innovation Sprint Two: 2-Credits

- During the spring semester, the students will continue to advance their business plan from the fall courses and sprint. The Sprint Lab is a collaborative update session where student teams each share the progress they've made on the Sprint projects, discuss challenges, brainstorm new ideas and solutions, and get feedback and coaching along the way from faculty and each other. As a continuation of the Fall Sprint, the central focus of this course continues to be the advancement of a new product concept by cross-functional student teams.

Electives: Students can elect to complete their degree requirements with 6 additional credits via electives. Electives can be taken in the Fall, Spring, Summer or students can elect to extend their residency at MSU into the following fall to complete their degree. We believe that many of our international students will elect to extend their stay.

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- Electives must be approved by the Director of the MSIM program. Electives must be relevant to the students career objectives.

For students who do not complete their degree with electives, will have the option of completing their degree with a Capstone Leadership and Innovation Project:

Capstone Leadership and Innovation Project: 6-Credits

There are several options for how a student will be able to conduct their Capstone Leadership and Innovation Project. These include:

- **Internship or full-time job:** Either through an internship or full-time job, students will propose a specific capstone project. Projects will be approved by the Director.
- **Entrepreneur:** Students may consider pursuing their sprint project or alternative idea as an entrepreneurial endeavor. Students will define a specific capstone project as a deliverable. Projects will be approved by the Director.

AWARD LEVEL:

PROGRAM NAME:

PROGRAM CODE:

FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
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ENROLLMENT PROJECTIONS

Headcount

annual unduplicated headcount of students with declared major or minor within the program

	25	35	50	55
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Credit Hours

annual avg. credits hours earned per student in program related curriculum

	30	30	30	30
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Student FTE

Undergrad: (Headcount x CH)/30
Graduate: (Headcount x CH)/24

0	31.25	43.75	62.5	68.75
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Completions

Annual number of program completers

	25	35	50	55
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REVENUE

Tuition Revenue (net of waivers)	
Institutional Support	
Other Outside Funds (grants, gifts, etc.)	
Program Tuition/Fees	
Total Revenue	\$0
Total Revenue per Student FTE	#DIV/0!

	\$427,468	\$629,728	\$989,640	\$1,152,313
	\$15,750	\$22,050	\$31,500	\$34,650
	\$443,218	\$651,778	\$1,021,140	\$1,186,963
	\$14,183	\$14,898	\$16,338	\$17,265

EXPENDITURES

Tenure Track Faculty	FTE	
	Salary + Benefits	
Non-tenure Track Faculty <small>*Includes Adjunct Instructors</small>	FTE	0.8
	Salary + Benefits	\$82,875
Graduate Teaching Assistants	FTE	
	Salary + Benefits	
Staff	FTE	
	Salary + Benefits	
Total Faculty & Staff	FTE	0.8
	Salary + Benefits	\$82,875

			1.0	1.0
			\$162,500	\$162,500
	0.8	1.8	1.8	2.2
	\$82,875	\$204,940	\$211,418	\$255,274
	0.8	1.8	1.8	3.2
	\$82,875	\$204,940	\$211,418	\$417,774

Operations (supplies, travel, rent, etc)	\$30,000
Start-up Expenses (OTO)	\$35,000
Total Expenses	\$147,875

	\$30,000	\$45,000	\$45,000	\$50,000
	\$35,000			
	\$147,875	\$234,940	\$256,418	\$462,774

Student FTE to Faculty (TT + NTT) Ratio	0.0
Net Income/Deficit (Revenue - Expenses)	-\$147,875

	0.0	17.4	24.3	19.5	18.1
	-\$147,875	\$208,278	\$395,360	\$558,366	\$622,222

The signature of the campus Chief Financial Officer signifies that he/she has reviewed and assessed the fiscal soundness of the proposal and provided his/her recommendations to the Chief Academic Officer as necessary.

Campus Chief Financial Officer Signature
Level II Memorandum

Montana University System
INTENT TO PLAN FORM

Program/Center/Institute Title: Master of Science of Innovation and Management

Campus, School/Department: MSU Bozeman, Jake Jabs College of Business and Entrepreneurship Expected Submission Date: _____

Contact Name/Info: Mark Ranalli

To increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process, please complete this form not more than 18 months in advance of the anticipated date of submission of the proposed program/center/institute to the Board of Regents for approval. The completed form should not be more than 2-3 pages. For more information regarding the Intent to Plan process, please visit <http://mus.edu/che/arsa/academicproposals.asp>.

1) Provide a description of the program.

The Master of Science in Innovation and Management (MSIM) is a one-year, graduate program, designed specifically for recent Engineering and STEM (Science, Technology, Engineering and Mathematics) graduates, with most students enrolling immediately following their undergraduate degree and others with 1 to 3 years of work experience. The goal of the program is to provide these young professionals with a set of skills that will enable them to be more effective leaders, innovators, and team members in their respective careers.

Our belief is that these STEM graduates represent some of our brightest young adults, yet their college education is inadequately preparing them to have immediate impact and success in their early careers. Undergraduate focus on STEM curricula provides little opportunity for these students to learn the plethora of 'soft skills' and innovation skills that are imperative to successful careers. We believe that the MSIM program will arm these students with the tools and skills necessary to achieve early career success, help set them on accelerated career paths, and prepare them for future leadership roles.

The program will be designed around multiple 'innovation sprints' which will require teams of students to collaborate on the creation and advancement of a business plan. While the students are advancing their business plans, the curriculum will support their efforts – with classes that include financial analysis and valuation, competitive analysis, strategy, leadership, and marketing, as well as softer management skills. Each sprint will allow student teams to evaluate the viability of their business concept and provided them the opportunity to continue advancing that concept or begin anew with an alternative idea. This iterative approach will allow the students to build on their previous experience.

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

A 2013 study by the National Science Foundation (NSF) suggests a disconnect between skills desired by employers and professional development provided in STEM programs [*National Science Foundation (NSF), 2013a*]. Employers from diverse sectors expect STEM degree holders to have expert content knowledge, strong communication skills,

Montana University System
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a multidisciplinary focus, entrepreneurial and project management skills, a sense of professionalism, and the ability to apply knowledge across a broad context [*Council of Graduate Schools and Educational Testing Service, 2012*].

The US Department of Labor is forecasting almost 168,000 job openings in STEM-related management roles by 2024 (Bureau of Labor Statistics Report, 2017).

Despite employer expectations and projected increase in available opportunities, the NSF study indicates that today's STEM programs still leave critical gaps in skills focused on science communication, preparation for nonacademic careers, broadening the societal relevance of research (e.g., engaging nonscience audiences, policy makers, and stakeholders through outreach), and entrepreneurship.

The genesis of the MSIM program relates to the current challenges faced by many young STEM professionals, as they enter the workforce. The rigors of their undergraduate programs often leave these recent graduates with strong technical and analytical skills but underprepared for many of the managerial, organizational, and entrepreneurial challenges that they face as they enter the workforce.

3) Describe how the program fits with the institutional mission, strategic plan, and existing institutional program array.

The MSIM is fully aligned with MSU's mission and strategic plan and is complementary to our existing undergraduate entrepreneurship programs. MSU's new strategic plan, 'Choosing Promise', calls for an expansion of our overall graduate footprint, while also setting goals for the University to have greater impact on our Montana economy. We believe that by providing an immersive educational and experiential innovation-centric program to our STEM students we will be arming them with the necessary skills to build new Montana businesses and grow our economy.

As the Jake Jobs college of Business and Entrepreneurship we view this new Master's in Science in Innovation and Management program as being fully aligned with our strategic mission of Innovation, Creativity, and Growth.

4) Describe how the program, complements, or duplicates existing efforts in the MUS. Describe efforts that will be made to collaborate with similar programs at other institutions. If no efforts will be made, please explain why.

The MSIM program complements the engineering and broader STEM undergraduate programs across the entire MUS system. Not only do we see a significant demand from STEM students at MSU-Bozeman, we believe this program will be of interest to many other STEM students across the MUS and UM systems who currently choose similar programs out of state because of the lack of availability of a program in Montana. We also expect to draw students from the broader Northwest region.

Furthermore, the proposed program complements the efforts of the University of Montana system which has recently added a Master of Science in Business Analytics (MSBA) to its Master in Business Administration (MBA) and Master of Accountancy (MAcct) offerings. The addition of a MSBA is commendable and in direct response to specific discipline needs and opportunities and the fact that business knowledge and skills are too diverse in the

Montana University System
INTENT TO PLAN FORM

21st century to be captured only with the rubric of a MBA program. The proposed MSIM program focuses on addressing the innovation and management educational needs of a very specific niche of incoming students that are not addressed in the business -related graduate programs in the MUS system: the general management skills as taught in the UM MBA, accounting theory and skills as taught in UM's MACct or MSU's own Master of Professional Accountancy (MPAc) , or the business analytics as taught in UM's MSBA program.

Our proposed offering will add yet another reason for students from both within the state as well as from out-of-state and even internationally, to choose Montana as a destination for specialized higher education in Innovation and Management following a STEM undergraduate degree.

Signature/Date

College/School Dean:  5.10.19

Chief Academic Officer:  6-4-19

Chief Executive Officer:  June 4, 2019

Flagship Provost:  6-4-19

Flagship President:  June 4, 2019

Date of Final Review:

When submitting the proposal to the BOR, include this signed form with the Level II request.

May 20-21, 2020

ITEM 187-2011-R0520

Request authorization to separately name PhD in Mechanical Engineering

THAT

Request authorization that the standalone PhD in Mechanical Engineering be re-established.

EXPLANATION

The PhD program in Mechanical Engineering provided by the faculty of the Department of Mechanical and Industrial Engineering educates graduate students to be key contributors in advanced mechanical engineering research and development. Program graduates are equipped to work in either an academic or industrial setting. Individuals who earn a PhD in Mechanical Engineering are particularly suited to advanced research and development in many Montana industries including fuel cells, renewables and heating ventilation air conditioning (HVAC); biomedical and biomechanics; measurement systems including magnetic resonance and fluid systems; computational fluid dynamics; snow and ice mechanics.

This change is to reflect the growth of the doctoral program in mechanical engineering and to assign to the program's doctoral graduates the academic title and credential most appropriate for professional practice in this field. There would be no duplication of existing programs in the MUS. There would be no direct cost attributable to this change. There would be no changes in reporting lines, program mission, faculty assignments, or duplication of administrative activities. MSU offered a standalone PhD in Mechanical Engineering, as well as several other engineering disciplines, until 1996. This proposal requests re-establishment of the standalone PhD in Mechanical Engineering.

ATTACHMENTS

Academic Proposal Request Form
Curriculum Proposal form
Fiscal Analysis
Intent to Plan

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

ITEM 187-2011-R0520 Submission Month or Meeting: May 20-21,2020

Institution: Montana State University-Bozeman CIP Code: 14.1901

Program/Center/Institute Title: Mechanical and Industrial Engineering Department

Includes (please specify below): Online Offering _____ Options _____

Please mark the appropriate type of request and submit with an Item Template and any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/preparingacademicproposals.asp>.

 A. Level I:

Campus Approvals

 1a. Placing a postsecondary educational program into moratorium (Program Termination and Moratorium Form)

 1b. Withdrawing a postsecondary educational program from moratorium

 2. Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less

 3. Establishing a B.A.S./A.A./A.S. area of study

 4. Offering an existing postsecondary educational program via distance or online delivery

OCHE Approvals

 5. Re-titling an existing postsecondary educational program

 6. Terminating an existing postsecondary educational program (Program Termination and Moratorium Form)

 7. Consolidating existing postsecondary educational programs (Curriculum Proposal Form)

 8. Establishing a new minor where there is a major or an option in a major (Curriculum Proposal Form)

 9. Revising a postsecondary educational program (Curriculum Proposal Form)

 10. Establishing a temporary C.A.S. or A.A.S. degree program *Approval limited to 2 years*

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ACADEMIC PROPOSAL REQUEST FORM

B. Level II:

- X** 1. **Establishing a new postsecondary educational program** (Curriculum Proposal and Completed Intent to Plan Form)
2. **Exceeding the 120 credit maximum for baccalaureate degrees** *Exception to policy 301.11*
3. **Forming, eliminating or consolidating an academic, administrative, or research unit** (Curriculum or Center/Institute Proposal and Completed Intent to Plan Form, except when eliminating or consolidating)
4. **Re-titling an academic, administrative, or research unit**

Proposal Summary [360 words maximum]

What

Re-establishment of a standalone PhD in Mechanical Engineering

Why

This change is to reflect the growth of the doctoral program in mechanical engineering and to assign to the program's doctoral graduates the academic title and credential most appropriate for professional practice in this field.

Resources

There would be no direct cost attributable to this change. There would be no changes in reporting lines, program mission, faculty assignments, or duplication of administrative activities.

Relationship to similar MUS programs

There would be no duplication of existing programs in the MUS. There are no other programs in Mechanical Engineering at the PhD level within the Montana University System. The current mechanical engineering option within the Engineering PhD has admitted students with a wide range of backgrounds and undergraduate degrees. The openness to a wide range of undergraduate degrees will not change with the re-establishment of a PhD in Mechanical Engineering.

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CURRICULUM PROPOSAL FORM

- 1. Overview of the request and resulting changes.** Provide a one-paragraph description of the proposed program. Will this program be related or tied to other programs on campus? Describe any changes to existing program(s) that this program will replace or modify. *[100 words]*

The proposal requests permission to offer a separately named PhD program in Mechanical Engineering. This change is to reflect the growth of the doctoral program in mechanical engineering and to assign to the program's doctoral graduates the academic title and credential most appropriate for professional practice in this field. There would be no duplication of existing programs in the MUS and no direct cost attributable to this change. MSU offered a standalone PhD in Mechanical Engineering, as well as several other engineering disciplines, until 1996. At that time, the MSU College of Engineering consolidated its doctoral programs into a single PhD in Engineering.

- 2. Relation to institutional strategic goals.** Describe the nature and purpose of the new program in the context of the institution's mission and core themes. *[200 words]*

The PhD program in Mechanical Engineering provided by the faculty of the Department of Mechanical and Industrial Engineering educates graduate students to be key contributors in advanced mechanical engineering research and development. Program graduates are equipped to work in either an academic or industrial setting. Individuals who earn a PhD in Mechanical Engineering are particularly suited to advanced research and development in many Montana industries: aerospace including dynamics, controls and structures; materials and structures including composites, ceramics and micro-electro-mechanical systems (MEMS); energy systems including fuel cells, renewables and heating ventilation air conditioning (HVAC); biomedical and biomechanics; measurement systems including magnetic resonance and fluid systems; computational fluid dynamics; snow and ice mechanics..

Montana State University is a doctoral university, and increasing the rate of doctoral graduates is a key part of MSU's Strategic Plan (e.g., see Objective D.3: "Expand the scale, breadth and quality of doctoral education."). Re-establishing the separately named PhD program in Mechanical Engineering will allow increased recruitment of prospective doctoral students who are best served by a "PhD in Mechanical Engineering," which is the academic title and credential most appropriate for professional practice in this field.

- 3. Process leading to submission.** Briefly detail the planning, development, and approval process of the program at the institution. *[100 words]*

Upon realization that our program had grown enough to return to the PhD in Mechanical Engineering rather than the generic PhD in Engineering with a mechanical engineering option we immediately initiated this application.

- 4. Program description.** Please include a complete listing of the proposed new curriculum in Appendix A of this document.

Until 1996, MSU offered a standalone PhD in Mechanical Engineering, as well as several other engineering disciplines. In 1996, following system-wide program review due to a budget reduction, the MSU College of Engineering consolidated its doctoral programs into a single PhD in Engineering that had four options, including Mechanical Engineering. MSU established a standalone PhD in Computer Science in 2002, a

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CURRICULUM PROPOSAL FORM

standalone PhD in Electrical Engineering in 2017 and a standalone PhD in Chemical Engineering in 2019. This proposal requests re-establishment of the standalone PhD in Mechanical Engineering. Due to the growth in our current doctoral program option and the support of the MSU administration, this proposal has been prepared.

- a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program	49
Credits in required courses offered by other departments	11
Credits in institutional general education curriculum	0
Credits of free electives	0
Total credits required to complete the program	60

- List the program learning outcomes for the proposed program. Use learner-centered statements that indicate what students will know, be able to do, and/or value or appreciate as a result of completing the program.

At the conclusion of the doctoral program in mechanical engineering, students are expected to be able to:

- Effectively apply theories, experimental methods, and scientific knowledge to address fundamental research questions in mechanical engineering and related fields.
- Demonstrate a broad mastery of mechanical engineering knowledge sufficient to enable effective teaching, advising, mentoring, and assessment of student learning at the college or university level.
- Pursue research of significance to the field of mechanical engineering or a closely related interdisciplinary field, demonstrating intellectual independence and scholarly productivity.
- Demonstrate advanced skill in oral and written communication sufficient for successful peer-reviewed scholarly publications, presentations, and grant proposals.
- Understand and follow the principles of ethics in research and scholarly activity.
- Understand and follow standard safety practices in laboratory and industrial settings.
- Enable and encourage participation in the field of chemical engineering by individuals from diverse and/or underrepresented groups.

- 5. Need for the program.** To what specific student, regional, and statewide needs is the institution responding to with the proposed program? How will the proposed program meet those needs? Consider workforce, student, economic, societal, and transfer needs in your response as appropriate. *[250 words]*

The proposal requests permission to offer a separately named PhD program in Mechanical Engineering. This change is to reflect the growth of the doctoral program in mechanical engineering and to assign to the program's doctoral graduates the academic title and credential most appropriate for professional practice in

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this field. There would be no duplication of existing programs in the MUS. There would be no direct cost attributable to this change. There would be no changes in reporting lines, program mission, faculty assignments, or duplication of administrative activities. MSU offered a standalone PhD in Mechanical Engineering, as well as several other engineering disciplines, until 1996. At that time, the MSU College of Engineering consolidated its doctoral programs into a single PhD in Engineering. Thus, this proposal requests re-establishment of the standalone PhD in Mechanical Engineering.

The proposed re-establishment of the standalone MechE PhD also enables Montana State University to improve recruitment of top students from across the country and around the world by offering a degree with a widely recognized title, Ph.D. in Mechanical Engineering, rather than the PhD in Engineering with an option in mechanical engineering.

6. Similar programs. Use the table below to identify and describe the relationship between any similar programs within the Montana University System.

Institution Name	Degree	Program Title
(MSU)	(PhD)	(existing combined PhD in Engineering program)

- a. If the proposed program substantially duplicates another program offered in the Montana University System, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. *[200 words]*

No duplication

- b. Describe any efforts that were made to collaborate with similar programs at other institutions. If no efforts were made, please explain why. *[200 words]*

There are no other programs in Mechanical Engineering at the PhD level within the Montana University System. The current mechanical engineering option with the Engineering PhD has admitted students with a wide range of backgrounds and undergraduate degrees. The openness to a wide range of undergraduate degrees will not change with the re-establishment of a PhD in Mechanical Engineering.

7. Implementation of the program. When will the program be first offered? If implementation will occur in phases, please describe the phased implementation plans. *[100 words]*

As the existing PhD in Engineering with the mechanical engineering option already exists, there will be a seamless and immediate transition to the new standalone degree upon program approval. We will work with the MSU Registrar’s Office and Graduate School to implement the required clerical notations.

- a. Complete the following table indicating the projected enrollments in and graduates from the proposed program.

Fall Headcount Enrollment					Graduates				
AY 20	AY 21	AY 22	AY 23	AY 24	AY 20	AY 21	AY 22	AY 23	AY 24

Montana Board of Regents
CURRICULUM PROPOSAL FORM

22	25	27	29	30	3	3	4	4	5
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- b. Describe the methodology and sources for determining the enrollment and graduation projections above. *[200 words]*

Our recent graduate enrollment in the mechanical engineering option of the PhD in Engineering and the number of degrees earned (parenthesis), is as follows:

AY16: 16 (2); AY17: 14 (1); AY18: 17 (2)

Our experience is that the students require approximately 5 years to earn the PhD, and so our ongoing enrollment of more than 10 students results in a rate of approximately 2 graduates per year on average. As our enrollment has been growing, and is expected to continue to grow as MSU and the Mechanical and Industrial Engineering Department place increased emphasis on doctoral education, we anticipate 30 or more students enrolled by AY22, and an average of 4-5 graduates per year.

- c. What is the initial capacity for the program?

The MSU Mechanical and Industrial Engineering Department currently has 29 tenure-track faculty, and 24 are assigned a research role where PhD supervision is expected as part of their academic assignment and evaluation. We expect that each of those 24 tenure-track faculty member will have at least one doctoral student, supporting a minimum capacity of 24 students. Many of our faculty support more than one doctoral student, so a target capacity of 30 or more students is expected.

- 8. Program assessment.** How will success of the program be determined? What action would result if this definition of success is not met? *[150 words]*

The program will be assessed in three areas: student recruitment, student progress towards the PhD degree, and graduation rate. Student recruiting refers to our ability to attract and admit high-quality applicants. Successful student progress towards the degree refers to the enrolled students passing our Qualifying Exam on schedule, scheduling and successfully passing the Comprehensive Exam within 2 years of passing the Qualifying Exam, preparing a high-quality dissertation, and defending the dissertation within 5-6 years of starting the program. Finally, we consider 4-5 students graduating per year a sustainable rate, given the size of our faculty and the extraordinary amount of time required to supervise and mentor PhD students.

If we find that we are not achieving these outcomes, the faculty will develop and implement a plan for improving performance in any area(s) that are found to be lagging, as these outcomes are largely under faculty control.

- a. Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program. When will assessment activities occur and at what frequency? *[150 words]*

The Mechanical Engineering PhD program has a set of built in assessments. First, admitted students must pass a Qualifying Exam, which is a 4-hour written exam covering the fundamental knowledge of an undergraduate program in Mechanical Engineering. The exam ensures that the student has the foundation to succeed in graduate-level coursework. Next, the student enrolls in approximately 30 credits of graduate coursework covering both fundamental and advanced topics in the field and initiates a

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research project. Specific course requirements include solid mechanics, fluids, continuum mechanics, advanced engineering analysis, numerical methods and thermodynamics. After approximately two and a half years, the student must form a Graduate Committee and work with their faculty research advisor to prepare a dissertation proposal. This proposal is presented as part of the Comprehensive Exam for the doctoral program. The student takes additional, elective coursework while performing the dissertation research. Finally, the student's overall accomplishments and the dissertation are evaluated in the final Dissertation Defense.

- b. What direct and indirect measures will be used to assess student learning? *[100 words]*

The student must pass the mandatory written and oral examinations (as described above), meet the minimum course credits and grade requirements of the graduate school (direct measures), and must also meet the research quality expectations and recommendations of the Advisor and the Graduate Committee (indirect measures). For example, doctoral students in the program are generally expected to prepare and present research conference papers and peer-reviewed manuscripts for journal publication while enrolled in the doctoral program.

- c. How will you ensure that the assessment findings will be used to ensure the quality of the program? *[100 words]*

The Mechanical and Industrial Engineering department has a faculty member who is the PhD program coordinator that works with the department head to monitor recruiting of graduate students, assistantship recommendations, preparation and grading of the Qualifying Exam, and many other duties associated with the PhD program. Ultimately, the Department Head is responsible for monitoring the state of the PhD program.

- d. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation. *[100 words]*

Doctoral programs in engineering do not receive a specialized accreditation. MSU's undergraduate mechanical engineering, mechanical engineering technology and industrial engineering programs are accredited by ABET.

9. Physical resources.

- a. Describe the existing facilities, equipment, space, laboratory instruments, computer(s), or other physical equipment available to support the successful implementation of the program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated? *[200 words]*

The re-establishment of the Mechanical Engineering PhD program will utilize the existing research and teaching space, equipment, and facilities currently used by the Mechanical and Industrial Engineering department to deliver the Mechanical Engineering option in the current PhD in Engineering program.

- b. List needed facilities, equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. (Enter the costs of those physical resources into the budget sheet.) How will the need for these additional resources be met? *[150 words]*

There are no incremental needs or costs associated with re-establishing the Mechanical Engineering PhD program.

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10. Personnel resources.

- a. Describe the existing instructional, support, and administrative resources available to support the successful implementation of the program. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained? *[200 words]*

The MSU Mechanical and Industrial Engineering department has 29 tenure-track faculty, 10 instructional faculty, and 4 support staff (administrative assistant, accounting support, and student success coordinators). The department currently provides the following degree programs:

- Mechanical Engineering (approximately 1000 students)
- Mechanical Engineering Technology (approximately 250 students)
- Industrial Engineering (approximately 120 students)
- Financial Engineering (approximately 60 students)
- Master of Science - Mechanical Engineering (approximately 30 students)
- Master of Science - Industrial Engineering (approximately 12 students)
- Master of Engineering - mechanical engineering (approximately 3 students)
- Seamless Masters - Industrial Engineering (approximately 3 students)
- PhD in Engineering (mechanical engineering) (approximately 22 students)
- PhD in Engineering (industrial engineering) (approximately 8 students)

- b. Identify new personnel that must be hired to support the proposed program. (Enter the costs of those personnel resources into the budget sheet.) What are the anticipated sources or plans to secure the needed qualified faculty and staff? *[150 words]*

No additional personnel or costs are associated with re-establishing the Mechanical Engineering PhD program.

11. Other resources.

- a. Are the available library and information resources adequate for the proposed program? If not, how will adequate resources be obtained? *[100 words]*

There are no incremental needs or costs associated with re-establishing the Mechanical Engineering PhD program.

- b. Do existing student services have the capacity to accommodate the proposed program? What are the implications of the new program on services for the rest of the student body? *[150 words]*

The change in student headcount will be small. We do not anticipate any capacity issues with student services.

12. Revenues and expenditures. Describe the implications of the new program on the financial situation of the institution. *[100 words]*

The students in the re-established Mechanical Engineering PhD program pay graduate tuition, which generally comes from their appointment as graduate research assistants funded by external grants and contracts. The

Montana Board of Regents
CURRICULUM PROPOSAL FORM

cost associated with instruction and support is not impacted by separating the Mechanical Engineering PhD from the existing PhD in Engineering.

- a. Please complete the following table of budget projections using the corresponding information from the budget template for the first three years of operation of the new program.

	Year 1	Year 2	Year 3
Revenues	\$0	3 new students = \$15,660 revenue	5 new students = \$26,100 revenue
Expenditures	\$0	\$0	\$0
Net Revenue (revenues-expenditures)	\$0	\$15,660	\$26,100

- b. Describe any expenses anticipated with the implementation of the new program. How will these expenses be met? *[200 words]*

There are no incremental needs or costs associated with re-establishing the Mechanical Engineering PhD program.

- i. If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs? *[150 words]*

The state appropriated funds that currently support research and graduate teaching in the Mechanical and Industrial Engineering department for the PhD in Engineering, mechanical engineering option, will be continued under the Mechanical Engineering PhD program. The source and assignment of the funds will not change.

- ii. If an increase in base funding is required to fund the program, indicate the amount of additional base funding and the fiscal year when the institution plans to include the base funding in the department's budget.

N/A

- iii. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? *[150 words]*

N/A

- iv. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? *[150 words]*

N/A

- 13. Student fees.** If the proposed program intends to impose new course, class, lab, or program fees, please list the type and amount of the fee.

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CURRICULUM PROPOSAL FORM

We plan no new fees. Engineering students are currently subject to the Engineering Program Fee, and this will still be true with the re-established Mechanical Engineering PhD.

14. Complete the fiscal analysis form.

Signature/Date

College or School Dean:
Brett Gunnink

DocuSigned by:
Brett Gunnink
4D3351D90E3C4F2...

Chief Academic Officer:
Robert Mokwa

DocuSigned by:
Robert Mokwa
212A28411AC04BD...

Chief Executive Officer:
Waded Cruzado

DocuSigned by:
Waded Cruzado
7D6A4CE96C3F415...

Flagship Provost*:
Robert Mokwa

DocuSigned by:
Robert Mokwa
212A28411AC04BD...

Flagship President*:
Waded Cruzado

DocuSigned by:
Waded Cruzado
7D6A4CE96C3F415...

*Not applicable to the Community College

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Appendix A – Proposed New Curriculum

A Mechanical Engineering Ph.D. Program of Study must include the following:

Course	Title	Credits
EGEN 505	Advanced Engineering Analysis	3
EGEN 506	Numerical Sol to Engr Problems	3
EM525	Continuum Mechanics	3
	Solid Mechanics Elective	3
	Fluids/Thermodynamics Elective	3
ENGR 610	Rsch & Mthds in Engineering	3
ENGR 694	Seminar	1-2
Dissertation		18-25
Other Graded Courses*		15-23

Qualifying Examination: The exam will be administered on the second Tuesday in February of the Spring semester. The undergraduate Mechanical Engineering topics will include: Thermodynamics, Heat (energy) transfer, Fluid Mechanics, Structural Mechanics, Materials, Dynamics and Vibrations, and Mathematics. Students will solve problems in 4 of the 7 topic areas. The exam will be 5 hours duration in an open book, open notes format. Each problem set will be graded by the faculty member that submitted the set. The results will be analyzed by the Mechanical Engineering graduate studies committee, and each candidate will receive a grade of Pass (P), Fail (F) or Remediate (R). Students will not be given the test back in order to protect the questions from dissemination. In cases where remediation in certain topic areas is required, the Ph.D. adviser will develop a problem-solving-based plan with the Ph.D. candidate to prepare for a retest on the identified topic areas. The retest must occur prior to the next fall semester and will be overseen by the Ph.D. adviser.

Comprehensive Examination: The public research seminar will include 40 minutes for the student's presentation and 10 minutes for questions from the audience. This will be followed immediately by a closed-session oral examination of 45-90 minutes by the student's Ph.D. committee and additional remediation may be required at this point.

* All credits must also meet the following conditions:

- ≤ 6 credits Independent Study (EMEC 592).
- ≤ 3 credits pass/fail, excluding dissertation.

Academic Degree Program Proposal - Fiscal Analysis Form

CAMPUS:	MSU-Bozeman
AWARD LEVEL:	PhD
PROGRAM NAME:	Mechanical Engineering
PROGRAM CODE:	

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
ENROLLMENT PROJECTIONS					
Headcount					
annual unduplicated headcount of students with declared major or minor within the program	22	25	27	29	30
Credit Hours					
annual avg. credits hours earned per student in program related curriculum	6	6	6	6	6
Student FTE					
Undergrad: (Headcount x CH)/30 Graduate: (Headcount x CH)/24	5.5	6.25	6.75	7.25	7.5
Completions					
Annual number of program completers	3	3	4	4	5

REVENUE					
Tuition Revenue (net of waivers)		\$15,660	\$26,100	\$36,540	\$41,760
Institutional Support	\$0	\$0	\$0	\$0	\$0
Other Outside Funds (grants, gifts, etc.)	\$0	\$0	\$0	\$0	\$0
Program Tuition/Fees	\$0	\$0	\$0	\$0	\$0
Total Revenue	\$0	\$15,660	\$26,100	\$36,540	\$41,760
Total Revenue per Student FTE	\$0	\$2,506	\$3,867	\$5,040	\$5,568

EXPENDITURES						
Tenure Track Faculty	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Non-tenure Track Faculty <small>*Includes Adjunct Instructors</small>	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Graduate Teaching Assistants	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Staff	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Total Faculty & Staff	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Operations (supplies, travel, rent, etc)		\$0	\$0	\$0	\$0	\$0
Start-up Expenses (OTO)		\$0	\$0	\$0	\$0	\$0
Total Expenses		\$0	\$0	\$0	\$0	\$0

Student FTE to Faculty (TT + NTT) Ratio	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Net Income/Deficit (Revenue - Expenses)	\$0	\$15,660	\$26,100	\$36,540	\$41,760

The signature of the campus Chief Financial Officer signifies that he/she has reviewed and assessed the fiscal soundness of the proposal and provided his/her recommendations to the Chief Academic Officer as necessary.

DocuSigned by:

 5302B65C2C4746C...

 Campus Chief Financial Officer Signature

Chief Financial Officer Comments

Montana University System
INTENT TO PLAN FORM

Program/Center/Institute Title: **PhD in Mechanical Engineering**

Campus, School/Department: **MSU, Mechanical and Industrial Engineering**

Expected Submission Date: **July, 2019**

Contact Name/Info: **Daniel Miller, Department Head, danmiller@montana.edu**

To increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process, please complete this form not more than 18 months in advance of the anticipated date of submission of the proposed program/center/institute to the Board of Regents for approval. The completed form should not be more than 2-3 pages. For more information regarding the Intent to Plan process, please visit <http://mus.edu/che/arsa/academicproposals.asp>.

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

MSU requests authorization to offer a separately named PhD program in Mechanical Engineering. Currently, there is a Mechanical Engineering option within the overarching PhD in Engineering. A Mechanical Engineering PhD was offered in the past but has not existed in Montana since 1996. At that time, the MSU College of Engineering consolidated its doctoral programs into a single PhD in Engineering. This proposal requests re-establishment of the standalone PhD in Mechanical Engineering. The requested change is to reflect the growth of the doctoral program in Mechanical Engineering and to assign to the program's doctoral graduates the academic title and credential most appropriate for professional practice in this field. There would be no duplication of existing programs in the MUS. There would be no direct cost attributable to this change. There would be no changes in reporting lines, program mission, faculty assignments, or duplication of administrative activities.

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

Considering continuing and incoming students, 24 PhD in Engineering, Mechanical Engineering Option students are expected to be enrolled in the fall 2019 semester. With steady and continued enrollment growth, the program is ready to once again be a stand-alone major with more appropriate credentialing. The PhD program offered by the faculty of the Department of Mechanical and Industrial Engineering educates graduate students to be key contributors in mechanical engineering topics through advanced research and development. Program graduates are well equipped and will typically work in either an academic or commercial/governmental setting. Individuals who earn a PhD in Mechanical Engineering are particularly suited for advanced research and development in many Montana-relevant disciplines including: aerospace including dynamics, controls and structures; materials and structures including composites, ceramics and micro-electro-mechanical systems (MEMS); energy systems including fuel cells, renewables and heating ventilation air conditioning (HVAC); biomedical and biomechanics; measurement systems including magnetic resonance and fluid systems; computational fluid dynamics; snow and ice mechanics.

3) Describe how the program/center/institute fits with the institutional mission, strategic plan, and existing institutional program array.

Montana State University is an R-1 doctoral granting institution and increasing the number and rate of doctoral graduates is a key focus of MSU's new strategic plan Choosing Promise. Under *Goal 1.3 Expand high-quality*

Montana University System
INTENT TO PLAN FORM

graduate education, one of the Metrics and Actions defines the goal to increase the number of research doctoral degrees awarded annually to 90 from a current level of 66. PhD program growth has resulted, in part, from the ongoing institutional focus on growing doctoral programs that has been embraced by departmental faculty. Re-establishing the separately named PhD program in Mechanical Engineering will allow increased recruitment of prospective doctoral students who are best served by a "PhD in Mechanical Engineering," which is the academic title and credential most appropriate for professional practice in this field.

- 4) Describe how the program/center/institute overlaps, complements, or duplicates existing efforts in the MUS. Describe efforts that will be made to collaborate with similar programs at other institutions. If no efforts will be made, please explain why.

There are no other PhD programs in Mechanical Engineering within the Montana University System. To our knowledge, there are no other institutions within Montana equipped and prepared to offer the same or a similar degree. The current Mechanical Engineering Option within the Engineering PhD has admitted students with a wide range of backgrounds and undergraduate degrees. The openness to a wide range of undergraduate degrees will not change with the re-establishment of a PhD in Mechanical Engineering.

Signature/Date

College/School Dean:

6/20/19

Chief Academic Officer:

7-9-19

Chief Executive Officer:

Flagship Provost*:

7-9-19

Flagship President*:

July 16, 2019

*Not applicable to the Community Colleges.

Date of Final Review:

When submitting the proposal to the BOR, include this signed form with the Level II request.

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

May 2020

ITEM 188-1001-R0520

Request for authorization to establish options in Software Engineering, Data Science, and Algorithm Design in the Computer Science B.S., and offer blended delivery of the program.

Institution: University of Montana-Missoula

CIP Code: 11.0701

Program/Center/Institute Title: Computer Science B.S.

Includes (please specify below): Face-to-face Offering: Online Offering: Blended Offering: X

Options: Software Engineering, Data Science, Algorithm Design

Proposal Summary [360 words maximum]

What:

The University of Montana-Missoula requests authorization from the Montana Board of Regents to establish a bachelor of science in Computer Science with options in Software Engineering, Data Science, and Algorithm Design and offer online delivery of the program.

Why:

The Computer Science department is restructuring its curriculum and would like to add official options that will appear on the student's transcripts, a powerful enticement to study Computer Science at UM. The modern economy is dependent on the skills being taught in computer science programs. While UM's program is contemporary, it does not currently reflect the range of skills that employers have demanded in recent years. Specifically, computer scientists now serve in diverse roles such as software engineers, cloud architects, and data scientists. These expanded roles reflect more opportunities for students, and the changes proposed provide new career choices for students who are looking for options beyond the current degree program. These proposed changes to the curriculum are a result of consultations with the advisory board, faculty, and students, and better reflect the diversity of modern technology jobs. These new concentrations in our degree program will 1) provide a better trained workforce for Montana, and 2) create opportunities for students that are not well served by the current degree.

Resources:

There are no new resources required.

ATTACHMENTS

Curriculum Proposal Form
Fiscal Analysis Form
Intent to Plan (January 2020)

Please mark the appropriate type of request and submit with any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/academicproposals.asp>.

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

 A. Level I:

Campus Approvals

 1a. **Placing a postsecondary educational program into moratorium** (Program Termination and Moratorium Form)

 1b. **Withdrawing a postsecondary educational program from moratorium**

 2. **Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less**

 3. **Establishing a B.A.S./A.A./A.S. area of study**

 4. **Offering an existing postsecondary educational program via distance or online delivery**

OCHE Approvals

 5. **Re-titling an existing postsecondary educational program**

 6. **Terminating an existing postsecondary educational program** (Program Termination and Moratorium Form)

 7. **Consolidating existing postsecondary educational programs** (Curriculum Proposal Form)

 8. **Establishing a new minor where there is a major or an option in a major** (Curriculum Proposal Form)

 9. **Revising a postsecondary educational program** (Curriculum Proposal Form)

 10. **Establishing a temporary C.A.S. or A.A.S. degree program** *Approval limited to 2 years*

 X B. Level II:

 X 1. Establishing a new postsecondary educational program (Curriculum Proposal and Completed Request to Plan Form)

 2. **Permanent authorization for a temporary C.A.S. or A.A.S degree program** (Curriculum Proposal and Completed Request to Plan Form)

 3. **Exceeding the 120-credit maximum for baccalaureate degrees** *Exception to policy 301.11*

 4. **Forming, eliminating or consolidating an academic, administrative, or research unit** (Curriculum or Center/Institute Proposal and completed Request to Plan, except when eliminating or consolidating)

 5. **Re-titling an academic, administrative, or research unit**

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- 1. Overview of the request and resulting changes.** Provide a one-paragraph description of the proposed program. Will this program be related or tied to other programs on campus? Describe any changes to existing program(s) that this program will replace or modify. *[100 words]*

The existing UM Computer Science B.S. will be replaced by one in which students select from one of three areas of concentration: Software Engineering, Data Science, or Algorithm Design. The Algorithm Design concentration will largely mimic the current degree, with a few modernizations. The other two are novel and responsive to changes in the marketplace for computer science majors.

- 2. Relation to institutional strategic goals.** Describe the nature and purpose of the new program in the context of the institution’s mission and core themes. *[200 words]*

The program modifications are well-aligned with the University of Montana’s mission and strategic visions. All of our proposed changes are intended to increase the quality of the curriculum and respond directly to current workforce demands. The changes are also intended to boost student performance and interest by providing more routes to completion via the three distinct options. Throughout our vision, a desire to engage students in interdisciplinary education can be found. Our department prides itself on the research collaborations its faculty have across the campus, and how those collaborations inform our teaching and guide the student experience. More tangibly, the new curriculum is designed with flexibility and modularity in mind, providing students interested in computational skills, but not necessarily a computer science degree, opportunities to acquire micro-credentials like a certificate of programming competence or a well-articulated minor in computer science.

- 3. Process leading to submission.** Briefly detail the planning, development, and approval process of the program at the institution. *[100 words]*

The Computer Science faculty held regular meetings in order to articulate the new curriculum. Plans were further refined by subcommittees that developed the complete curriculums found in each of the three proposed areas of concentration. Once the program modifications were developed, they were presented to the advisory board and colleagues at Missoula college and Montana Tech for comment. In all cases the feedback was positive and minor suggestions were incorporated in the proposal presented here. The Chair then met with the Dean of the College of Humanities and Sciences to review the curriculum proposal and an Intent to Plan Form was subsequently submitted.

- 4. Program description.** Please include a complete listing of the proposed new curriculum in Appendix A of this document.

- a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program	31-40
Credits in required courses offered by other departments	7-20
Credits in institutional general education curriculum	42-47
Credits of free electives	9-15

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Total credits required to complete the program	104-114
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- b. List the program learning outcomes for the proposed program. Use learner-centered statements that indicate what students will know, be able to do, and/or value or appreciate as a result of completing the program.

The degree program will enable students to attain, by the time of graduation:

- (a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline;
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
- (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs;
- (d) An ability to function effectively on teams to accomplish a common goal;
- (e) An understanding of professional, ethical, legal, security and social issues and responsibilities;
- (f) An ability to communicate effectively with a range of audiences;
- (g) An ability to analyze the local and global impact of computing on individuals, organizations, and society;
- (h) Recognition of the need for and an ability to engage in continuing professional development;
- (i) An ability to use current techniques, skills, and tools necessary for computing practice.

5. **Need for the program.** To what specific student, regional, and statewide needs is the institution responding to with the proposed program? How will the proposed program meet those needs? Consider workforce, student, economic, societal, and transfer needs in your response as appropriate. *[250 words]*

The Computer Science department is restructuring its curriculum and would like to add official options that will appear on the student’s transcripts, a powerful enticement to study Computer Science at UM. The modern economy is dependent on the skills being taught in computer science programs. While UM’s program is contemporary, it does not currently reflect the range of skills that employers have demanded in recent years. Specifically, computer scientists now serve in diverse roles such as software engineers, cloud architects, and data scientists. These expanded roles reflect more opportunities for students, and the changes proposed provide new career choices for students who are looking for options beyond the current degree program. These proposed changes to the curriculum are a result of consultations with the advisory board, faculty, and students, and better reflect the diversity of modern technology jobs. These new concentrations in our degree program will 1) provide a better trained workforce for Montana, and 2) create opportunities for students that are not well served by the current degree.

6. **Similar programs.** Use the table below to identify and describe the relationship between any similar programs within the Montana University System.

Institution Name	Degree	Program Title
Montana State University	B.S.	Computer Science – options in Professional and Interdisciplinary
Montana State University	B.A.	Computer Science

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Montana Tech	B.S.	Computer Science – options in Business Applications, Electronic Control Systems, Engineering Applications, Game Development, Health Care Informatics, Statistics, and Technical Communications
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- a. If the proposed program substantially duplicates another program offered in the Montana University System, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. *[200 words]*

This proposal is more akin to a program modification than a request for a new program. Many MUS schools offer training in computer science. A four-year degree can be obtained at MSU, UM, and Montana Tech. UM has offered a CS degree for at least 40 years. This proposal maintains UM’s original degree in a more contemporary way. Our approach is comparable to that of Montana Tech, with specializations. However, we believe having concentrations appear on the degree is a better approach given our objectives.

- b. Describe any efforts that were made to collaborate with similar programs at other institutions. If no efforts were made, please explain why. *[200 words]*

The department is in communication with other Computer Science programs in the state of Montana, especially those at Montana Tech and Missoula College who look to UM to help set their own curriculum. The proposed changes were shared with them and have been met with approval. A larger network of Montana Computer Science programs including MSU, Great Falls College, Rocky Mountain College, Carroll College, City College, Highland College, Helena College, and Flathead Valley Community College met on the 8th of August 2019. The changes were presented in this forum and met with approval. Importantly, the contents of the first two years are aligned to what is currently offered in the community college system so that transferability will be unchanged.

7. Implementation of the program. When will the program be first offered? If implementation will occur in phases, please describe the phased implementation plans. *[100 words]*

Implementation will occur in AY20-21.

- a. Complete the following table indicating the projected enrollments in and graduates from the proposed program.

Fall Headcount Enrollment					Graduates				
AY18-19	AY19-20	AY20-21	AY21-22	AY22-23	AY18-19	AY19-20	AY20-21	AY21-22	AY22-23
207	221	237	253	271	19	28	36	44	54

- b. Describe the methodology and sources for determining the enrollment and graduation projections above. *[200 words]*

We begin with our CS BS degree enrollment and number of graduates for 2018-19. Assuming current trends in enrollment remain, we anticipate an annual growth of 7% (3% current growth rate is maintained, plus 4% additional due to curriculum changes proposed here) in response the addition of popular data science and software engineering options. We also increase the fraction of our majors graduating each year, due to the more inclusive set of concentrations, from the current rate of 10% to

Montana Board of Regents
CURRICULUM PROPOSAL FORM

20%, increasing at 2.5% a year. This increase in the graduation rate reflects a better retention that will be achieved with the new set of options.

- c. What is the initial capacity for the program?

With 6 tenure track faculty and 2 full-time instructors we can successfully accommodate an enrollment of about 260 students. With the hiring of one more tenure track faculty in the 2019-20 academic year (approved), we anticipate that we can manage 300 undergraduate students. This assumes that we continue to observe the cap of 35 students per section or course for classes above the 100 level.

- 8. Program assessment.** How will success of the program be determined? What action would result if this definition of success is not met? *[150 words]*

Success will be measured by total student enrollment, students graduated per year, retention rates, exit and alumni survey results, and feedback from our advisory board (a group of organizations that employ our graduates and similar education institutions).

- a. Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program. When will assessment activities occur and at what frequency? *[150 words]*

We rely on the following forms of assessment: 1) in-class assessments performed every year in core CS classes that measure student growth based on formal learning outcomes as enumerated previously, 2) external assessment provided by members of the local computer science community who mentor students in our capstone course, 3) exit surveys completed by seniors as they leave the program.

- b. What direct and indirect measures will be used to assess student learning? *[100 words]*

Our curriculum depends heavily on the use of programming assignments and testing to assess the understanding of students. These direct measures are found in nearly every class we offer. Students are expected to display competence in areas of computational thinking, programming, problem solving, and group work. Core CS concepts are assessed through examinations given throughout the semester, as well as a final examination. Perhaps the ultimate form of direct assessment is the capstone course, where students spend an entire semester developing a software system with an actual client. In this course, they are assessed on how well they function within a team, as well as the quality of the final product they deliver. Indirect assessments are described in 8(a).

- c. How will you ensure that the assessment findings will be used to ensure the quality of the program? *[100 words]*

The results of assessment are often discussed in faculty meetings, typically a few times a year. We diligently record notes during our annual advisory board meetings and compile and analyze student exit surveys. When University assessment reports are due, typically in December, we take occasion to commit an entire meeting to where we are, and where we need to go with assessment. The results of assessments are folded into nearly every major curricular decision made by the department. All of this will continue to be true if the proposed changes are approved.

- d. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation. *[100 words]*

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We plan to maintain our accreditation with the Northwest Commission on Colleges and Universities (NWCCU). This is not specialized, but the accreditation pursued by many departments at UM.

9. Physical resources.

- a. Describe the existing facilities, equipment, space, laboratory instruments, computer(s), or other physical equipment available to support the successful implementation of the program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated? *[200 words]*

We currently occupy the fourth floor of the Social Sciences building. This 4800 square foot space includes 10 faculty offices, a conference room, mail room and kitchen, a student lounge, and 6 graduate student work spaces. Additionally, we have priority scheduling for two classrooms that have been upgraded with modern presentation technologies.

- b. List needed facilities, equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. (Enter the costs of those physical resources into the budget sheet.) How will the need for these additional resources be met? *[150 words]*

No additional resources are required.

10. Personnel resources.

- a. Describe the existing instructional, support, and administrative resources available to support the successful implementation of the program. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained? *[200 words]*

We currently have 6 tenure track faculty, 2 full-time instructors, and 2 1/3 FTE of an administrative support persons effort. We will be hiring another tenure track faculty in the 2019-20 academic year. Since this proposal is essentially a program modification rather than a new program, we don't anticipate the need for additional resources and believe we can seamlessly offer the new program with the personnel we have.

- b. Identify new personnel that must be hired to support the proposed program. (Enter the costs of those personnel resources into the budget sheet.) What are the anticipated sources or plans to secure the needed qualified faculty and staff? *[150 words]*

No additional resources are required.

11. Other resources.

- a. Are the available library and information resources adequate for the proposed program? If not, how will adequate resources be obtained? *[100 words]*

Yes, available resources are adequate.

- b. Do existing student services have the capacity to accommodate the proposed program? What are the implications of the new program on services for the rest of the student body? *[150 words]*

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We take the fact that our current program is adequately served by student services and surmise that under the new curriculum our needs would continue to be met.

12. Revenues and expenditures. Describe the implications of the new program on the financial situation of the institution. *[100 words]*

We anticipate that these changes will have no negative affects on the institution's finances. Revenues are outlined below.

- a. Please complete the following table of budget projections using the corresponding information from the fiscal analysis form for the first three years of operation of the new program.

	Year 1	Year 2	Year 3
Revenues	\$929,156	\$991,997	\$1,063,816
Expenses	\$1,030,225	\$1,192,865	\$1,225,621
Net Income/Deficit (revenues-expenses)	-\$101,069	\$200,867	\$161,805

- b. Describe any expenses anticipated with the implementation of the new program. How will these expenses be met? *[200 words]*

No new expenses are anticipated.

- i. If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs? *[150 words]*

N/A

- ii. If an increase in base funding is required to fund the program, indicate the amount of additional base funding and the fiscal year when the institution plans to include the base funding in the department's budget.

N/A

- iii. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? *[150 words]*

N/A

- iv. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? *[150 words]*

N/A

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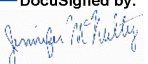
13. Student fees. If the proposed program intends to impose new course, class, lab, or program fees, please list the type and amount of the fee.

N/A

14. Complete the fiscal analysis form.

Signature/Date


College or School Dean:

DocuSigned by:

1829FE6B3E644DC...


Chief Academic Officer:

Chief Executive Officer:

Flagship Provost*:

DocuSigned by:

34E1E62599324B7...

Flagship President*:

DocuSigned by:

9672218F28384DA...

*Not applicable to the Community Colleges.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Appendix A – Proposed New Curriculum
Part I: New Catalog Entry

Bachelor of Science - Computer Science

College of Humanities & Sciences

Degree Specific Credits: 104-114

Required Cumulative GPA: 2.0

Catalog Year: 2020-2021

General Education Requirements

Information regarding these requirements can be found in the [General Education Section](#) of the catalog.

Summary

Code	Title	Hours
	Computer Science Core Courses	29
	Concentration (choose one)	
	Software Engineering	33
	Data Science	38
	Algorithm Development	35
	Science Core	9-10
	Science Electives	6-10
	Communication	3

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Code	Title	Hours
	General Education Electives	24
	Additional Computer Science Electives	9-15
Total Hours		104-114

Computer Science Core Courses

Note: CSCI 315E will fulfill the upper-division writing requirement.

Complete all of the following courses:

Code	Title	Hours
<u>CSCI 106</u>	Careers in Computer Science	1
CSCI 150	Fund of Computer Science 0	3
CSCI 151	Fund of Computer Science 1	3
CSCI 152	Fund of Computer Science 2	3
CSCI 222	Web Applications Development I	3
CSCI 250	Data Structures and Algorithms 1	3
CSCI 350	Data Structures and Algorithms 2	3
<u>CSCI 315E</u>	Computers, Ethics, and Society	3

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Code	Title	Hours
<u>M 171 or M162</u>	Calculus I or Applied Calculus	4
<u>M 225</u>	Discrete Math	3
Total Hours		29

Minimum Required Grade: C-

Concentrations

Rule: All students must choose one of the following three concentrations and complete all required courses listed within.

Software Engineering Concentration

Notes: CS Electives: Computer Science courses numbered 300 or above. A maximum of 3 credits of Computer Science electives may be in CSCI 390 or CSCI 490. A maximum of 3 credits of Computer Science electives may be in CSCI 398 or CSCI 498.

Students choosing the Software Engineering concentration may take Applied Calculus, M162 instead of Calculus I, M172.

Code	Title	Hours
CSCI 181	Web Design and Programming	3
CSCI 322	Web Applications Development II	3

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Code	Title	Hours
<u>CSCI 340</u>	Database Design and Programming	3
CSCI 426	Senior Capstone I	3
CSCI 427	Senior Capstone II	3
<u>CSCI 443</u> or CSCI 400	User-Interface Design <i>or</i> Digital Entrepreneurship	3
CSCI 300-400	CS Electives	15

Total Hours **33**

Minimum Required Grade: C-

Data Science Concentration

Note: Advanced Math Elective: Calculus III *or* Practical Big Data Analytics *or* Ordinary Differential Equations *or* Numerical Analysis *or* Statistical, Dynamical, and Computational Modeling *or* Data Science Analytics. **Data Science App Elective:** Capstone sequence (I & II) *or* Math: Data Science Projects *or* MIS: Big Data Project *or* Internship/Research. **CS Electives:** CS courses numbered 300 or above. A maximum of 3 credits of Computer Science electives may be in CSCI 390 or CSCI 490. A maximum of 3 credits of Computer Science electives may be in CSCI 398 or CSCI 498.

Code	Title	Hours
<u>M 172</u>	Calculus II	4
<u>M 221</u>	Linear Algebra	3
<u>STAT 341</u>	Probability and Statistics	3

Complete all of the following courses:

Montana Board of Regents
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Code	Title	Hours
<u>CSCI 340</u>	Database Design and Programming	3
<u>CSCI 444</u>	Data Visualization	3
<u>CSCI 447</u>	Machine Learning	3
<u>CSCI 477</u>	Simulation	3
	Advanced Math Elective	3
	Data Science App Elective	3-6
CSCI 300-400	CS Electives	6-9
Total Hours		38

Minimum Required Grade: C-

Algorithm Development Concentration

Note: Algorithm Development Electives: (CSCI 480) Parallel Computing *or* (CSCI 491) Software Optimization
And: (CSCI 491) Cybersecurity *or* (CSCI 451) Computational Biology. **CS Electives:** CS courses numbered 300 or above. A maximum of 3 credits of Computer Science electives may be in CSCI 390 or CSCI 490. A maximum of 3 credits of Computer Science electives may be in CSCI 398 or CSCI 498.

Code	Title	Hours
Complete all of the following courses:		
<u>M 172</u>	Calculus II	4
<u>M 221</u>	Linear Algebra	3

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Code	Title	Hours
<u>STAT 341</u>	Probability and Statistics	3
CSCI 361	Architectures	3
CSCI 450	Advanced Algorithms	3
CSCI 300-400	CS Electives	12
	Algorithm Development Electives	6
Total Hours		38

Minimum Required Grade: C-

Science Core

Rule: Complete 1 of the following subcategories of science sequences. 9-10 total credits required.

Biology Sequence Option

Code	Title	Hours
Complete all of the following courses:		
<u>BIOB 160N</u>	Principles of Living Systems	3
<u>BIOB 161N</u>	Prncpls of Living Systems Lab	1
<u>BIOB 170N</u>	Prncpls Biological Diversity	3
<u>BIOB 171N</u>	Prncpls Biological Dvrsty Lab	2

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Code	Title	Hours
Total Hours		9
Course List		

Minimum Required Grade: C-

Chemistry Sequence Option

Code	Title	Hours
Complete all of the following courses:		
<u>CHMY 141N</u> & <u>CHMY 142N</u>	College Chemistry I and College Chemistry I Lab	5
<u>CHMY 143N</u> & <u>CHMY 144N</u>	College Chemistry II and College Chemistry II Lab	5
Total Hours		10
Course List		

Minimum Required Grade: C-

Physics Sequence Option

Code	Title	Hours
Complete all of the following courses:		
<u>PHSX 215N</u>	Fund of Physics w/Calc I	4
<u>PHSX 216N</u>	Physics Laboratory I w/Calc	1

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CURRICULUM PROPOSAL FORM

Code	Title	Hours
<u>PHSX 217N</u>	Fund of Physics w/Calc II	4
<u>PHSX 218N</u>	Physics Laboratory II w/Calc	1
Total Hours		10

Course List

Minimum Required Grade: C-

Science Electives

Rule: Complete 2 of the following courses. Laboratory courses must be taken in conjunction with their associated lecture course.

Note: The Biology, Chemistry, or Physics sequence chosen to fulfill the science core may not count toward the science electives requirement.

Code	Title	Hours
Complete two of the following courses:		6-10
<u>ASTR 131N</u> & <u>ASTR 134N</u>	Planetary Astronomy and Planetary Astronomy Lab	
<u>ASTR 132N</u> & <u>ASTR 135N</u>	Stars, Galaxies, and the Universe and Stars, Galaxies, and the Universe Lab	
<u>BIOB 160N</u> & <u>BIOB 161N</u>	Principles of Living Systems and Princpls of Living Systems Lab	
<u>BIOB 170N</u> & <u>BIOB 171N</u>	Princpls Biological Diversity and Princpls Biological Dvrsty Lab	

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Code	Title	Hours
<u>BIOM 250N</u> & <u>BIOM 251</u>	Microbiology for Hlth Sciences and Microbiology Hlth Sciences Lab	
<u>CHMY 141N</u> & <u>CHMY 142N</u>	College Chemistry I and College Chemistry I Lab	
<u>CHMY 143N</u> & <u>CHMY 144N</u>	College Chemistry II and College Chemistry II Lab	
<u>FORS 201</u>	Forest Biometrics	
<u>GEO 101N</u> & <u>GEO 102N</u>	Introduction to Physical Geology and Introduction to Physical Geology Lab	
<u>GEO 225</u>	Earth Materials	
<u>PHSX 215N</u> & <u>PHSX 216N</u>	Fund of Physics w/Calc I and Physics Laboratory I w/Calc	
<u>PHSX 217N</u> & <u>PHSX 218N</u>	Fund of Physics w/Calc II and Physics Laboratory II w/Calc	
<u>PHSX 343</u>	Modern Physics	
<u>PHSX 444</u>	Advanced Physics Lab	
Total Hours		6-10

Course List

Minimum Required Grade: C-

Communication

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Code	Title	Hours
Complete one of the following courses:		3
<u>COMX 111A</u>	Introduction to Public Speaking	
<u>COMX 242</u>	Argumentation	
Total Hours		3

Course List

Minimum Required Grade: C-

Part II Curriculum Diagram

(see final page)

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Computer Science BS Degree

Approximate Level	Senior	15 Credits of 300 level or higher CS Electives And, the following: Capstone II Capstone I	Software Eng. (33 Cr.)	6-9 Credits of 300 level or higher CS Electives And, the following: Data Sci. App. Elective Advance Math Elective	Data Science (38 Cr.)	12 Credits of 300 level or higher CS Electives And, the following: Advanced Algorithms Algo. Dev. Electives	Algorithm Dev. (35 Cr.)																		
	Junior	Adv. Software Elective Databases Web App. Dev. II Web Design		Machine Learning Simulation Databases Data Visualization Probability and Stats. Linear Algebra Calculus II		Architectures Probability and Stats. Linear Algebra Calculus II																			
Sophomore	Freshman	Core for all CS Majors (29 Credits)																							
		<table border="1"> <thead> <tr> <th>Purpose</th> <th>Classes</th> <th>Credits</th> </tr> </thead> <tbody> <tr> <td>Perspective</td> <td>Ethics</td> <td>(3)</td> </tr> <tr> <td>Practice</td> <td>Web Applications Development[†]</td> <td>(3)</td> </tr> <tr> <td>Theory</td> <td>Data Structures and Algorithms 1[†],2</td> <td>(6)</td> </tr> <tr> <td>Introduction</td> <td>Computer Science 0[†], 1[†], 2[†]</td> <td>(9)</td> </tr> <tr> <td>Mathematics</td> <td>Calculus I* and Discrete Math</td> <td>(7)</td> </tr> <tr> <td>Support</td> <td>Freshman Seminar</td> <td>(1)</td> </tr> </tbody> </table> <p>[†] 15 credits required for CS minor [*] Applied Calculus (4) may be taken for the Software Engineering Path</p>	Purpose	Classes	Credits	Perspective	Ethics	(3)	Practice	Web Applications Development [†]	(3)	Theory	Data Structures and Algorithms 1 [†] ,2	(6)	Introduction	Computer Science 0 [†] , 1 [†] , 2 [†]	(9)	Mathematics	Calculus I* and Discrete Math	(7)	Support	Freshman Seminar	(1)		
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Take throughout	<table border="1"> <thead> <tr> <th colspan="2">General Ed. Requirements (42-47 Credits)</th> </tr> <tr> <th>Elective Category</th> <th>Credits</th> </tr> </thead> <tbody> <tr> <td>Science Core Electives</td> <td>(9-10)</td> </tr> <tr> <td>Additional Science Electives</td> <td>(6-10)</td> </tr> <tr> <td>Communications</td> <td>(3)</td> </tr> <tr> <td>Remaining General Education Electives</td> <td>(24)</td> </tr> </tbody> </table>							General Ed. Requirements (42-47 Credits)		Elective Category	Credits	Science Core Electives	(9-10)	Additional Science Electives	(6-10)	Communications	(3)	Remaining General Education Electives	(24)						
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Additional Science Electives	(6-10)																								
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Remaining General Education Electives	(24)																								

Advanced Software Elective: Digital Entrepreneurship **or** Human Computer Interaction

Advanced Math Elective: Calculus III **or** Practical Big Data Analytics **or** Ordinary Differential Equations **or** Numerical Analysis **or** Statistical, Dynamical, and Computational Modeling **or** Data Science Analytics

Data Science App Elective: Capstone Sequence **or** Math: Data Science Projects **or** MIS: Big Data Project **or** Internship (3 credits) **or** Research (3 credits)

Algorithm Development Electives: Parallel Computing **or** Software Optimization **or** Cybersecurity **or** Compilers **or** Computational Biology

Academic Degree Program Proposal - Fiscal Analysis Form

CAMPUS: UM Missoula
AWARD LEVEL: UG
PROGRAM NAME: Computer Science
PROGRAM CODE:

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
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ENROLLMENT PROJECTIONS

Headcount	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
annual unduplicated headcount of students with declared major or minor within the program	0	14	30	46	64
Credit Hours					
annual avg. credits hours earned per student in program related curriculum	15	15	15	15	15
Student FTE					
Undergrad: (Headcount x CH)/30 (Headcount x CH)/24	0	7	15	23	32
Graduate:					
Completions					
Annual number of program completers	0	9	17	25	25

REVENUE

Tuition Revenue (net of waivers)	\$0	\$50,273	\$107,728	\$165,183	\$229,820
Institutional Support	\$0	\$0	\$0	\$0	\$0
Other Outside Funds (grants, gifts, etc.)	\$0	\$0	\$0	\$0	\$0
Program Tuition/Fees	\$0	\$0	\$0	\$0	\$0
Total Revenue	\$0	\$50,273	\$107,728	\$165,183	\$229,820
Total Revenue per Student FTE	\$0	\$7,182	\$7,182	\$7,182	\$7,182

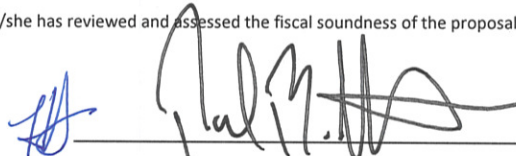
EXPENDITURES

Tenure Track Faculty	FTE	0.0	1.0	1.0	1.0	1.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Non-tenure Track Faculty <small>*Includes Adjunct Instructors</small>	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Graduate Teaching Assistants	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Staff	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Total Faculty & Staff	FTE	0.0	1.0	1.0	1.0	1.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0

Operations (supplies, travel, rent, etc)					
Start-up Expenses (OTO)	\$0	\$0	\$0	\$0	\$0
Total Expenses	\$0	\$0	\$0	\$0	\$0

Student FTE to Faculty (TT + NTT) Ratio	0.0	7.0	15.0	23.0	32.0
Net Income/Deficit (Revenue - Expenses)	\$0	\$50,273	\$107,728	\$165,183	\$229,820

The signature of the campus Chief Financial Officer signifies that he/she has reviewed and assessed the fiscal soundness of the proposal and provided his/her recommendations to the Chief Academic Officer as necessary.



 _____ 10-10-19
 Campus Chief Financial Officer Signature

Chief Financial Officer Comments

Montana University System
INTENT TO PLAN FORM

Program/Center/Institute
Title: Computer Science BS Degree Program

Campus, School/Department: University of Montana Computer Science Dept. Expected Submission Date: Fall 2019

Contact Name/Info: Jesse Johnson - Chair of Computer Science - 406-243-2356 -
jesse.johnson@umontana.edu

To increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process, please complete this form not more than 18 months in advance of the anticipated date of submission of the proposed program/center/institute to the Board of Regents for approval. The completed form should not be more than 2-3 pages. For more information regarding the Intent to Plan process, please visit <http://mus.edu/che/arsa/academicproposals.asp>.

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

The Computer Science department would like to change the requirements for the BS in Computer Science degree by reducing the number of core courses required by all majors to 29 credits and adding 3 new Concentrations. All students would have to choose between a Software Engineering, Data Science, or Algorithm Development Concentrations. In addition to the common core of 29 credits, each concentration has its own set of additional required courses ranging from 33-38 credits. Finally, 42-47 general education requirements are required.

The specifics of the new concentrations are:

Software Engineering: Students will master the skills and understanding required to design, develop, test, and maintain modern software systems.

Data Science: Students will apply the scientific method, along requisite analytic skills to large data sets, and with the aid of computer systems, develop insights into trends or relationships within the data.

Algorithm Development: Students selecting this concentration will develop the skills to apply computational theory and best practices to the design, development, and application of computer systems, inclusive of both hardware and software.

The Math/CS combined BS degree will be maintained, requiring the 29 credit core from CS, and a similar number of credits from Mathematics.

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

The productivity and efficiency of the modern economy are dependent on the computational advances taught in computer science programs. The utility of computation has produced tremendous demand for these skills, yet that demand is not being met. For example, recent estimates suggest only 10% of technology jobs in Montana are being filled.

The current UM-CS program is contemporary, focusing on the theory, design, development, and application of

Montana University System

INTENT TO PLAN FORM

software systems. However, that curriculum does not reflect the full range of skills Montana employers have demanded in recent years. Specifically, computer scientists are now asked to serve in roles including software engineer, cloud architect, data scientist, and network security specialist.

These expanded roles provide opportunities for our students in at least three ways: 1) there are now computer science career choices for students that struggle to fulfill the requirements of our current degree program. For instance, the duties of a software engineer do not require the mathematics and computational theory required by our current computer science majors. 2) students pursuing a concentration of courses in areas vital to employers will be stronger job candidates immediately after school. And, 3) the number of jobs at the intersection of computer science and another discipline are growing quickly.

After consulting with our advisory board, and engaging the faculty, we have made changes to our curriculum, making it more responsive to the full range of modern computing jobs. The alterations take the form of three concentrations in our degree program that will 1) provide a better trained workforce for Montana, 2) create new opportunities for students that are not well served by the current UM-CS degree, and 3) provide exit points that allow students to acquire computational skills, without completing a degree in CS.

3) Describe how the program/center/institute fits with the institutional mission, strategic plan, and existing institutional program array.

The program modifications being sought are well aligned with the University of Montana's mission and strategic visions as stated in version 1.1 of the UM Strategic Vision document (<http://www.umt.edu/strategy/strategic-vision/default.php>). In particular, the desire to improve our offerings through program modification is responsive to the University's mission to "pursue[s] academic excellence as demonstrated by the quality of curriculum and instruction, student performance...". All of our proposed changes are intended to increase the quality of the curriculum as they are directly responsive to current workforce demands. The changes are also intended to boost student performance and interest by providing more routes to completion via the three distinct concentrations.

Continuing in UM's vision document, we also note that in Strategic Opportunity 4, "Reinvent the Heart of the Curriculum" Initiative 1, we are encouraged to "prepare every graduate to excel in the areas of problem-solving, adaptability, communication, critical thinking, collaboration, creativity, and ethical reasoning." The curriculum changes proposed are very much targeted at this initiative.

Finally, throughout our vision, a desire to engage students in interdisciplinary education can be found. Our department prides itself on the research collaborations its faculty have across the campus, and how those collaborations inform our teaching and guide the student experience. More tangibly, the new curriculum is designed with flexibility and modularity in mind, providing students interested in computational skills, but not necessarily a computer science degree, opportunities to acquire micro-credentials like a certificate of programming competence or a well-articulated minor in CS.

4) Describe how the program/center/institute overlaps, complements, or duplicates existing efforts in the MUS. Describe efforts that will be made to collaborate with similar programs at other institutions. If no efforts will be made, please explain why.

Our proposal is more akin to a program modification than a request for a new program. Many MUS schools offer training in computer science. A four-year degree can be obtained at MSU, UM, and Montana Tech. UM has offered a CS degree for at least 40 years. In this proposal, we are continuing to offer that degree, but in a more contemporary way. Our approach is comparable to that of Montana Tech, with specializations. However, we believe having concentrations appear on the degree is a better approach given our objectives.

Montana University System
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We are in communication with other Computer Science programs in the state of Montana – especially those at Montana Tech and Missoula College, who look to us to help set their own curriculum. The proposed changes have been passed to them for comment met with approval. A larger network of Montana Computer Science programs including MSU, Great Falls College, Rocky Mountain College, Carroll College, City College, Highland College, Helena College, and Flathead Valley Community College, met on the 8th of August 2019. The changes were presented in this forum and met with approval. Importantly, the contents of the first two years are aligned to what is currently offered in the community college system so that transferability will be unchanged.

Signature/Date

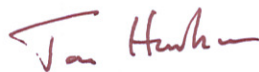
College/School Dean:



Chief Academic Officer:

Chief Executive Officer:

Flagship Provost*:



Flagship President*:



*Not applicable to the Community Colleges.

Date of Final Review:

When submitting the proposal to the BOR, include this signed form with the Level II request.

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

May 2020

ITEM 188-1002-R0520

Request for authorization to establish a B.F.A. in Creative Writing

Institution: University of Montana-Missoula

CIP Code: 23.1302

Program/Center/Institute Title: Creative Writing B.F.A.

Includes (please specify below): Face-to-face Offering: X Online Offering: _____ Blended Offering: _____

Options: _____

Proposal Summary [360 words maximum]

What:

The University of Montana-Missoula requests authorization from the Montana Board of Regents to establish a bachelor of fine arts in Creative Writing.

Why:

The English Department aims to more fully connect the study of literature and the study of creative writing to strengthen both of these paths of study. The new BFA will sustain and renew the Creative Writing program, a program that has had a national reputation since the 1960s and 1970s (when Richard Hugo taught here). BFA in Creative Writing programs throughout the Mountain West and the Pacific Northwest have grown in recent years, and given our reputation and resources, we are well positioned to respond to this new direction in the field. A BFA will be of immediate value to our students, our faculty, and the university as a whole. It will draw to the university students throughout the state, the region, and the country who want to study literature, creative writing, and the humanities. It will prepare our students for a job market that values clear expression, critical thinking, and creative versatility.

Resources:

No new resources are required.

ATTACHMENTS

- Curriculum Proposal Form
- Fiscal Analysis Form
- Intent to Plan

Please mark the appropriate type of request and submit with any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/academicproposals.asp>.

 A. Level I:

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

Campus Approvals

 1a. **Placing a postsecondary educational program into moratorium** (Program Termination and Moratorium Form)

 1b. **Withdrawing a postsecondary educational program from moratorium**

 2. **Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less**

 3. **Establishing a B.A.S./A.A./A.S. area of study**

 4. **Offering an existing postsecondary educational program via distance or online delivery**

OCHE Approvals

 5. **Re-titling an existing postsecondary educational program**

 6. **Terminating an existing postsecondary educational program** (Program Termination and Moratorium Form)

 7. **Consolidating existing postsecondary educational programs** (Curriculum Proposal Form)

 8. **Establishing a new minor where there is a major or an option in a major** (Curriculum Proposal Form)

 9. **Revising a postsecondary educational program** (Curriculum Proposal Form)

 10. **Establishing a temporary C.A.S. or A.A.S. degree program** *Approval limited to 2 years*

 X B. Level II:

 X 1. Establishing a new postsecondary educational program (Curriculum Proposal and Completed Request to Plan Form)

 2. **Permanent authorization for a temporary C.A.S. or A.A.S degree program** (Curriculum Proposal and Completed Request to Plan Form)

 3. **Exceeding the 120-credit maximum for baccalaureate degrees** *Exception to policy 301.11*

 4. **Forming, eliminating or consolidating an academic, administrative, or research unit** (Curriculum or Center/Institute Proposal and completed Request to Plan, except when eliminating or consolidating)

 5. **Re-titling an academic, administrative, or research unit**

Montana Board of Regents

CURRICULUM PROPOSAL FORM

- 1. Overview of the request and resulting changes.** Provide a one-paragraph description of the proposed program. Will this program be related or tied to other programs on campus? Describe any changes to existing program(s) that this program will replace or modify. *[100 words]*

The English Department is proposing a new BFA in Creative Writing to formalize and reframe a course of study already in place. The emphasis is on developing skills in creative writing (poetry, fiction, non-fiction), but in the new program (in line with best practices in the field), there is a strong emphasis on courses in literary study and a substantial component of courses in creative writing. There are also Special Topics courses that weave together these approaches, a Capstone course (requiring an extended manuscript or portfolio), and courses in revision, editorial work, and special topics.

- 2. Relation to institutional strategic goals.** Describe the nature and purpose of the new program in the context of the institution's mission and core themes. *[200 words]*

Our Creative Writing program has for decades had a national reputation. Several years ago, it was designated a Program of National Distinction at UM. Graduates of the program have won a wide range of awards and fellowships. The prestigious MFA in Creative Writing draws not only talented graduate students but also talented undergraduate students to the university. The new BFA builds on and extends this history distinctive to the English Department at UM and brings together the study of literature and the study of creative writing, aligned with the arts and humanities mission of UM. The Creative Writing program at UM has a long and impressive history at the undergraduate as well as the graduate (MFA) level. The BFA in Creative Writing is meant to sustain and renew this history by giving the Creative Writing program a new shape at the undergraduate level. This change will give new energy and scope to the Creative Writing program and the English Department as a whole. While the new BFA is a way to renew our educational ideals in the English Department, it is also a way to represent our department more clearly prospective students.

- 3. Process leading to submission.** Briefly detail the planning, development, and approval process of the program at the institution. *[100 words]*

The the English Department has discussed the new BFA over the last year with extensive conversations around its shape, its place in the department, and its effects on other programs. The Dean of the College of Humanities and Sciences was involved in these conversations. The Department would like to implement the new BFA by Fall 2020.

- 4. Program description.** Please include a complete listing of the proposed new curriculum in Appendix A of this document.

- a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program	42
Credits in required courses offered by other departments	0
Credits in institutional general education curriculum	15
Credits of free electives	18

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Total credits required to complete the program	42
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- b. List the program learning outcomes for the proposed program. Use learner-centered statements that indicate what students will know, be able to do, and/or value or appreciate as a result of completing the program.
- Students, through LIT as well as CRWR courses, should acquire broad knowledge of major creative works in one or more areas (poetry, fiction, non-fiction): they should, that is, acquire broad knowledge of literary traditions
 - Students should be able to write clear, perceptive, insightful essays about older and contemporary literary works
 - Students should gain broad knowledge of the essential craft techniques in one or more areas of creative writing (poetry, fiction, non-fiction)
 - Students should be able to write, submit for peer discussion and critique, and revise original works in one or more areas of creative writing (poetry, fiction, non-fiction)
 - Students should learn how to prepare and submit creative work to literary and commercial journals and magazines
 - Students, by the end of the senior capstone course, should produce an extended manuscript or a portfolio of their best work and, in connection with this, write an essay or "artist's statement" (5-10 pages) that expresses their account of their development as a writer
 - Students should be able to speak and write clearly about the place and importance in our culture of literature, creative writing, art, and the humanities

- 5. Need for the program.** To what specific student, regional, and statewide needs is the institution responding to with the proposed program? How will the proposed program meet those needs? Consider workforce, student, economic, societal, and transfer needs in your response as appropriate. *[250 words]*

The English Department aims to more fully connect the study of literature and the study of creative writing to strengthen both of these paths of study. The new BFA will sustain and renew the Creative Writing program, a program that has had a national reputation since the 1960s and 1970s (when Richard Hugo taught here). BFA in Creative Writing programs throughout the Mountain West and the Pacific Northwest have grown in recent years, and given our reputation and resources, we are well positioned to respond to this new direction in the field. A BFA will be of immediate value to our students, our faculty, and the university as a whole. It will draw to the university students throughout the state, the region, and the country who want to study literature, creative writing, and the humanities. It will prepare our students for a job market that values clear expression, critical thinking, and creative versatility.

- 6. Similar programs.** Use the table below to identify and describe the relationship between any similar programs within the Montana University System.

Institution Name	Degree	Program Title
N/A	N/A	N/A

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- a. If the proposed program substantially duplicates another program offered in the Montana University System, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. *[200 words]*

This would be the first program of its kind in the state.

- b. Describe any efforts that were made to collaborate with similar programs at other institutions. If no efforts were made, please explain why. *[200 words]*

The department feels UM’s national reputation as a leader in Creative Writing justifies establishing this new BFA in Creative Writing.

7. Implementation of the program. When will the program be first offered? If implementation will occur in phases, please describe the phased implementation plans. *[100 words]*

The Department would like to implement the program for AY20-21.

- a. Complete the following table indicating the projected enrollments in and graduates from the proposed program.

Fall Headcount Enrollment					Graduates				
AY19-20	AY20-21	AY21-22	AY22-23	AY23-24	AY19-20	AY20-21	AY21-22	AY22-23	AY23-24
0	0	2	2	5	0	0	0	0	2

- b. Describe the methodology and sources for determining the enrollment and graduation projections above. *[200 words]*

Currently there are about 175 English Majors at UM and about 40% of these, or about 70 students, are English Majors pursuing the CRWR Emphasis. That means that about 15 or 16 students with this Emphasis are graduating in a given year. The hope is that the new BFA will increase our majors and lend new energy, ambition, and excitement to the English Department as a whole.

- c. What is the initial capacity for the program?

About 70 students.

8. Program assessment. How will success of the program be determined? What action would result if this definition of success is not met? *[150 words]*

The success of the program will be measured first by the success of students: by their learning, the quality of their writing, their accomplishments, their own accounts of their experience in the program, and their success in publishing their work or being admitted to graduate schools or finding meaningful work after graduation. The alumni of the Creative Writing program at UM have a long history of impressive accomplishments in their life beyond UM.

One of our hopes is that the new BFA will bring new energy and ambition to the English Department, that it will draw to our department students throughout the state and the region and the country who want to study

Montana Board of Regents
CURRICULUM PROPOSAL FORM

creative writing in a challenging program. We hope to see an increase in majors in the English Department. We don't expect to see this in a year or two: we do hope to see it in five years and in ten years.

- a. Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program. When will assessment activities occur and at what frequency? *[150 words]*

The primary assessment process is faculty response to student work in relatively small classes and particularly in small workshops. Faculty respond to student work with grades, with detailed written comments, in discussions in classes, and in conversations in individual conferences. These are the core elements of the assessment of student work in the Creative Writing program and in the English Department as a whole.

Further, in every department at UM, student learning is assessed at a more general level every year or two. Professors gather and evaluate student work (outside the context of particular classes and grades) at different points in the curriculum. Usually the emphasis is on work in an upper-level or capstone course. Professors look at a relatively large sample of work to see which of the outcomes are being clearly met and which may need to be given more time and attention in future classes.

- b. What direct and indirect measures will be used to assess student learning? *[100 words]*

Direct measures: grades, detailed written comments, class discussions, individual conferences, individual mentoring.

Indirect measures: annual or bi-annual assessment of student work at different levels—in particular at the capstone level.

- c. How will you ensure that the assessment findings will be used to ensure the quality of the program? *[100 words]*

Professors in the program will pay attention to students in the program, in particular to the quality of student work, and they will communicate with one another about what they are seeing. Faculty in the department are committed teachers. They are deeply committed to the education of students in the program. They will rely on both direct and indirect assessment tools to measure the quality of the program.

- d. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation. *[100 words]*

There is no specialized accreditation for BA degrees in English or a BFA degree in Creative Writing.

9. Physical resources.

- a. Describe the existing facilities, equipment, space, laboratory instruments, computer(s), or other physical equipment available to support the successful implementation of the program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated? *[200 words]*

We will rely on the existing classrooms on campus—in particular on the LA Building that houses the English Department.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- b. List needed facilities, equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. (Enter the costs of those physical resources into the budget sheet.) How will the need for these additional resources be met? *[150 words]*

No new facilities are needed.

10. Personnel resources.

- a. Describe the existing instructional, support, and administrative resources available to support the successful implementation of the program. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained? *[200 words]*

No new instructional, support, and administrative resources are needed to implement the new BFA.

- b. Identify new personnel that must be hired to support the proposed program. (Enter the costs of those personnel resources into the budget sheet.) What are the anticipated sources or plans to secure the needed qualified faculty and staff? *[150 words]*

No new personnel are needed to support the new BFA.

11. Other resources.

- a. Are the available library and information resources adequate for the proposed program? If not, how will adequate resources be obtained? *[100 words]*

Yes

- b. Do existing student services have the capacity to accommodate the proposed program? What are the implications of the new program on services for the rest of the student body? *[150 words]*

Yes

12. Revenues and expenditures. Describe the implications of the new program on the financial situation of the institution. *[100 words]*

The new BFA will add no expenses to the current budget for the English Department at UM, but we expect it will increase enrollment by attracting new students.

- a. Please complete the following table of budget projections using the corresponding information from the fiscal analysis form for the first three years of operation of the new program.

	Year 1 AY20-21	Year 2 AY21-22	Year 3 AY22-23
Revenues	\$0	\$14,364	\$14,364
Expenses	\$0	\$0	\$0
Net Income/Deficit (revenues-expenses)	\$0	\$14,364	\$14,364

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- b. Describe any expenses anticipated with the implementation of the new program. How will these expenses be met? *[200 words]*

No new expenses are expected.

- i. If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs? *[150 words]*

N/A

- ii. If an increase in base funding is required to fund the program, indicate the amount of additional base funding and the fiscal year when the institution plans to include the base funding in the department's budget.

N/A

- iii. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? *[150 words]*

N/A

- iv. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? *[150 words]*

N/A

- 13. Student fees.** If the proposed program intends to impose new course, class, lab, or program fees, please list the type and amount of the fee.

N/A

- 14.** Complete the fiscal analysis form.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Signature/Date

College or School Dean:

DocuSigned by:
Jennifer A. Kelly
1829FE6B3E644DC...

Chief Academic Officer:

Chief Executive Officer:

Flagship Provost*:

DocuSigned by:
Jon Harbor
34E1E62599324B7...

Flagship President*:

DocuSigned by:
Seth Bodnar
9672218E29384DA...

*Not applicable to the Community Colleges.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Appendix A – Proposed New Curriculum

A word on the curricular map of the BFA in Creative Writing. The BFA in Creative Writing is a 42-credit degree whereas the current BA in English with a Creative Writing Emphasis is a 39-credit degree. The Core courses of the two programs are the same: 3 lower-division LIT courses, 2 lower-division CRWR courses (though BFA students are required to take introductory CRWR courses in two different genres), and 2 300-division LIT courses that are gateway courses. 1 3-credit course has been added to the required upper-division electives, but of the 3 courses now required at this level, 2 must be LIT courses. This is a crucial change: it means that the BFA requires 7 LIT courses in all (whereas the current BA in English with a Creative Writing Emphasis requires only 5 LIT courses). The BFA is thus a particularly demanding degree option that is quite close to a double BFA in Creative Writing and BA in English with a Literature Emphasis. It is our belief, indeed, that many of the BFA students will decide to earn both the BFA in Creative Writing and the BA in English with a Literature Emphasis degree. Having both these degrees will serve these students well after graduation.

BA IN ENGLISH / CREATIVE WRITING EMPHASIS

I. CORE Courses (21 credits)

> 100- and 200-level LIT courses (9 credits)

LIT 110 Intro to Literature

Two of the following courses:

LIT 202 Environmental Imagination

LIT 236 Literary Histories

LIT 246 Genres, Themes, Approaches

LIT 291 Special Topics

*The 100- and 200-level LIT courses are L and W

*The 200-level LIT courses are usually capped at 25

> 200-level CRWR courses (6 credits)

Two of the following courses:

CRWR 210 Fiction Workshop

CRWR 211 Poetry Workshop

CRWR 212 Nonfiction Workshop

*One English elective allowed in place

of a second 200-level workshop

BFA IN CREATIVE WRITING

I. CORE Courses (21 credits)

> 100- and 200-level LIT courses (9 credits)

LIT 110 Intro to Literature

Two of the following courses:

LIT 202 Environmental Imagination

LIT 236 Literary Histories

LIT 246 Genres, Themes, Approaches

LIT 291 Special Topics

*The 100-200-level LIT courses are L and W

*The 200-level LIT courses are usually capped at 25

> 200-level CRWR courses (6 credits)

Two of the following courses:

CRWR 210 Fiction Workshop

CRWR 211 Poetry Workshop

CRWR 212 Nonfiction Workshop

*Students are required to take workshops

in two different genres

Montana Board of Regents
CURRICULUM PROPOSAL FORM

> 300-level gateway LIT courses (6 credits)

LIT 300 Literary Criticism

LIT 327 Shakespeare

*300 is a pre-requisite for 400-level courses

> 300-level gateway LIT courses (6 credits)

LIT 300 Literary Criticism

LIT 327 Shakespeare

*300 is a pre-requisite for 400-level courses

II. Upper-level ELECTIVES (6 credits): choose

two 300-400-level courses among offerings in LIT, FILM, non-workshop CRWR, Irish Studies, and MCLL

II. Upper-level ELECTIVES (9 credits): choose

two 300-400-level LIT courses and one 300-400-level course among offerings in LIT, FILM, non-workshop CRWR, Irish Studies, and WLC

III. Upper-level CRWR courses (12 credits)

Four of the following courses (one of which must be a 300-level workshop, one a 400-level workshop):

CRWR 310 Fiction Workshop

CRWR 311 Poetry Workshop

CRWR 312 Nonfiction Workshop

CRWR 320 Craft of Revision

CRWR 322 Art of the Modern Essay

CRWR 410 Fiction Workshop

CRWR 411 Poetry Workshop

CRWR 412 Nonfiction Workshop

CRWR 425 Storytelling

CRWR 391 Special Topics

CRWR 491 Special Topics

III. Upper-level CRWR courses (9 credits)

Three of the following courses (one of which must be a 300-level workshop):

CRWR 310 Fiction Workshop

CRWR 311 Poetry Workshop

CRWR 312 Nonfiction Workshop

CRWR 320 Craft of Revision

CRWR 322 Art of the Modern Essay

CRWR 425 Storytelling

CRWR 391 Special Topics

CRWR 394 Oval Magazine Editorial Board

CRWR 491 Special Topics

Montana Board of Regents
CURRICULUM PROPOSAL FORM

IV. CAPSTONE (3 credits)

One of the following courses:

CRWR 483 Fiction Workshop

CRWR 481 Poetry Workshop

CRWR 482 Nonfiction Workshop

IV. FOREIGN LANGUAGE: two years of a single modern or classical language or the equivalent (202+) score on a competency exam

IV. FOREIGN LANGUAGE: two years of a single modern or classical language or the equivalent (202+) score on a competency exam

Academic Degree Program Proposal - Fiscal Analysis Form

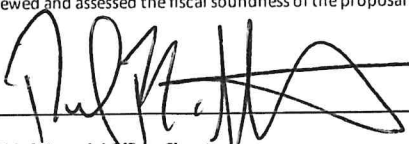
CAMPUS: UM
AWARD LEVEL: UG
PROGRAM NAME: BFA in Creative Writing
PROGRAM CODE:

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
ENROLLMENT PROJECTIONS					
Headcount annual unduplicated headcount of students with declared major or minor within the program	1	3	3	4	4
Credit Hours annual avg. credits hours earned per student in program related curriculum	27	27	27	27	27
Student FTE Undergrad: (Headcount x CH)/30 Graduate: (Headcount x CH)/24	0.9	2.7	2.7	3.6	3.6
Completions Annual number of program completers	0	0	0	1	3

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
REVENUE					
Tuition Revenue (net of waivers)	\$6,464	\$19,391	\$19,391	\$25,855	\$25,855
Institutional Support					
Other Outside Funds (grants, gifts, etc.)					
Program Tuition/Fees					
Total Revenue	\$6,464	\$19,391	\$19,391	\$25,855	\$25,855
Total Revenue per Student FTE	\$7,182	\$7,182	\$7,182	\$7,182	\$7,182

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
EXPENDITURES					
Tenure Track Faculty					
FTE					
Salary + Benefits					
Non-tenure Track Faculty					
FTE					
Salary + Benefits					
Graduate Teaching Assistants					
FTE					
Salary + Benefits					
Staff					
FTE					
Salary + Benefits					
Total Faculty & Staff					
FTE					
Salary + Benefits					
Operations (supplies, travel, rent, etc)					
Start-up Expenses (OTO)					
Total Expenses	\$0	\$0	\$0	\$0	\$0
Student FTE to Faculty (TT + NTT) Ratio	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Net Income/Deficit (Revenue - Expenses)	\$6,464	\$19,391	\$19,391	\$25,855	\$25,855

The signature of the campus Chief Financial Officer signifies that he/she has reviewed and assessed the fiscal soundness of the proposal and provided his/her recommendations to the Chief Academic Officer as necessary.


 Campus Chief Financial Officer Signature

3/31/20

Chief Financial Officer Comments

Note. These numbers are estimates. The new BFA will add no expenses to the current budget for the English Department at UM. A few of our courses are near capacity at present (see comments in 12 in Curriculum Proposal Form). We are capable of flexibility, of moving TT faculty around, to staff all our courses. - Roberr Baker, Chair of English.

Montana University System
INTENT TO PLAN FORM

Program/Center/Institute Title: **BFA in Creative Writing**

Campus, School/Department: **UM College of Humanities & Sciences / English**

Expected Submission Date: **May 2019**

Contact Name/Info: **Robert Baker, Chair of English / robert.baker@mso.umt.edu**

To increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process, please complete this form not more than 18 months in advance of the anticipated date of submission of the proposed program/center/institute to the Board of Regents for approval. The completed form should not be more than 2-3 pages. For more information regarding the Intent to Plan process, please visit <http://mus.edu/che/arsa/academicproposals.asp>.

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

The Department of English plans to propose a new BFA in Creative Writing. To some extent this new degree is a reframing of the current BA in English with a Creative Writing emphasis: it gives a new formal shape to a course of study that to some extent is already in place. But it also makes changes to this course of study. The emphasis is still on developing skills in creative writing (poetry, fiction, creative non-fiction), but in the new program (in line with recommendations in the field for a vital BFA) there is strong emphasis on weaving together a substantial component of courses in literary study and a substantial component of creative writing workshops. There are also Special Topics courses that interweave these approaches, a Capstone course (requiring an extended manuscript or a portfolio), and courses in editing, revision, and writing in the workplace. Our intent is to provide students with a wide-ranging education in literary study and creative writing that will prepare them for either graduate study (in literature, creative writing, or both) or the competitive job market of our time.

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

We are imagining anew what the English Department at UM could be in the present and the future. We want, first of all, to more fully interweave the study of literature and the study of creative writing and, so, to strengthen both of these paths of study. We want, further, to sustain and renew the Creative Writing program, a program that has had a national reputation since the 1960s and 1970s (when Richard Hugo taught here). In recent years that has been a growth of BFA in Creative Writing programs throughout the Mountain West and the Pacific Northwest, and given our reputation and our resources, we are well positioned to respond to this direction in the field. A BFA in Creative Writing will be of immediate value to our students (see above), our faculty, and the university as a whole. It will draw to the university students throughout the state, the region, and the country who want to study literature, creative writing, and the humanities. It will bring new energy and ambition to the English Department.

Montana University System
INTENT TO PLAN FORM

3) Describe how the program/center/institute fits with the institutional mission, strategic plan, and existing institutional program array.

First, as said above, the BFA in Creative Writing will more fully bring together the study of literature and the study of creative writing at UM and, so, will strengthen these two fields with a long history at the heart of the arts and humanities mission of the university.

Second, as noted above, the Creative Writing program at UM has a long and impressive history at the undergraduate as well as the graduate (MFA) level. The BFA in Creative Writing is meant to sustain and renew this history by giving the creative writing program a new shape at the undergraduate level in particular. This change, we believe, will give new energy and scope to the entire Creative Writing program and indeed to all programs in the English Department.

Finally, while the BFA in Creative Writing is above all a way to renew our educational ideals in the English Department, it is at the same time a way to represent our department more clearly to the community, alumni, and prospective students. The Creative Writing program has for decades had a national reputation. Several years ago it was designated a Program of National Distinction at UM. Writers in the program have won a range of awards and fellowships. The prestigious graduate MFA program in Creative Writing draws not only talented graduate students but also talented undergraduate students to the university. The new BFA in Creative Writing builds on and extends this history distinctive to the English Department at UM.

4) Describe how the program/center/institute overlaps, complements, or duplicates existing efforts in the MUS. Describe efforts that will be made to collaborate with similar programs at other institutions. If no efforts will be made, please explain why.

There are other Writing and Creative Writing programs throughout the state, including at MSU, but there is no Creative Writing program in the state that has the national reputation of the Creative Writing program at UM.

There is at present (as far as we know) no BFA in Creative Writing program in the state. The proposed BFA in Creative Writing at UM would be the first such program.

Montana University System
INTENT TO PLAN FORM

Signature/Date

College/School Dean:

Chief Academic Officer:

Chief Executive Officer:

Flagship Provost*:

Flagship President*:

*Not applicable to the Community Colleges.

Date of Final Review:

When submitting the proposal to the BOR, include this signed form with the Level II request.

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

May 2020

ITEM 188-1003-R0520

Request for authorization to establish a B.A in World Languages and Cultures, and establish blended delivery

Institution: University of Montana-Missoula

CIP Code: 16.0101

Program/Center/Institute Title: World Languages and Cultures B.A.

Includes (please specify below): Face-to-face Offering: Online Offering: Blended Offering:

Options: _____

Proposal Summary [360 words maximum]

What:

The University of Montana-Missoula requests authorization from the Montana Board of Regents to establish a bachelor of arts in World Languages and Cultures.

Why:

Language specific majors require a high number of sequential credits in the target language. If students do not begin their language study in the first year it is often difficult, if not impossible, to complete a language-specific major in four years. Many students do not begin learning a language until their second or third year. This problem is particularly salient among students transferring from institutions that lack foreign language instruction capacities.

Additionally, language students are often interested in comparative studies, which then compounds the challenge of finding a single major that reflects the different languages and cultures that they have studied. This major provides an avenue for students to complete a degree founded in language and cultural studies that goes beyond the traditional single-language major.

Moreover, we face global challenges that transcend the traditional national boundaries and are no longer limited to regions of single cultures or language-speakers. This major better represents the importance of global/transnational cultural awareness and the ability to understand today's challenges from a variety of cultural perspectives.

Finally, a BA in World Languages and Cultures will encourage collaboration between many departments on campus providing language students better access to opportunities in fields that they may not otherwise study.

Resources:

There are no additional resources requested.

ATTACHMENTS

- Curriculum Proposal Form
- Fiscal Analysis Form
- Intent to Plan

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

Please mark the appropriate type of request and submit with any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/academicproposals.asp>.

 A. Level I:

Campus Approvals

 1a. Placing a postsecondary educational program into moratorium (Program Termination and Moratorium Form)

 1b. Withdrawing a postsecondary educational program from moratorium

 2. Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less

 3. Establishing a B.A.S./A.A./A.S. area of study

 4. Offering an existing postsecondary educational program via distance or online delivery

OCHE Approvals

 5. Re-titling an existing postsecondary educational program

 6. Terminating an existing postsecondary educational program (Program Termination and Moratorium Form)

 7. Consolidating existing postsecondary educational programs (Curriculum Proposal Form)

 8. Establishing a new minor where there is a major or an option in a major (Curriculum Proposal Form)

 9. Revising a postsecondary educational program (Curriculum Proposal Form)

 10. Establishing a temporary C.A.S. or A.A.S. degree program *Approval limited to 2 years*

 x **B. Level II:**

 X **1. Establishing a new postsecondary educational program** (Curriculum Proposal and Completed Request to Plan Form)

 2. Permanent authorization for a temporary C.A.S. or A.A.S degree program (Curriculum Proposal and Completed Request to Plan Form)

 3. Exceeding the 120-credit maximum for baccalaureate degrees *Exception to policy 301.11*

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

4. Forming, eliminating or consolidating an academic, administrative, or research unit (Curriculum or Center/Institute Proposal and completed Request to Plan, except when eliminating or consolidating)

5. Re-titling an academic, administrative, or research unit

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- 1. Overview of the request and resulting changes.** Provide a one-paragraph description of the proposed program. Will this program be related or tied to other programs on campus? Describe any changes to existing program(s) that this program will replace or modify. *[100 words]*

The BA in World Languages and Cultures is not language- or culture-specific (unlike existing majors in Classics, French, German, Japanese, Russian, or Spanish). This degree will serve students who: (1) begin studying languages and cultures late in their academic careers and want complete a major which emphasizes a combination of languages and cultures; (2) are interested in comparative approaches to language and cultural studies; and (3) are unable to complete a language-specific major and want to complete a major utilizing the credits earned in language-specific disciplines. This degree will supplement existing language/culture specific options and build on the newly established World Competencies Certificate by contributing to a system of stackable credentials.

- 2. Relation to institutional strategic goals.** Describe the nature and purpose of the new program in the context of the institution's mission and core themes. *[200 words]*

The BA in World Languages contributes directly to the University's mission to "shape global citizens who are creative and agile learners committed ...to building and sustaining diverse communities." It provides global perspectives and avenues for learning about global citizenship by preparing students to use diverse languages and appreciate cultures found in communities throughout the world. Additionally, the major is "responsive to the needs of Montanans" as it will accommodate transfer students, who are unable to spend the required time on campus completing a four-year language sequence. This BA is an opportunity to encourage students throughout MUS to study languages not available at their home institutions, since they will be able to transfer to a four-year major at UM more fluidly. With the growth on on-line and distance education, this program may serve further as a gateway to students beginning their course of language training before transferring to campus.

- 3. Process leading to submission.** Briefly detail the planning, development, and approval process of the program at the institution. *[100 words]*

Although various permutations of this type of program have been discussed in WLC over the years, the new major in Multidisciplinary Studies (approved March 2020) informed the development of this major in its current form modeled on other general majors, such as the non-specialized option found in mathematics. The section heads in the department like the flexibility this major offers to students with an interest in more than one language tradition or region.

- 4. Program description.** Please include a complete listing of the proposed new curriculum in Appendix A of this document.

- a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program	12-20
Credits in required courses offered by other departments	0

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Credits in institutional general education curriculum	12-26
Credits of free electives	27
Total credits required to complete the program	39-47

- b. List the program learning outcomes for the proposed program. Use learner-centered statements that indicate what students will know, be able to do, and/or value or appreciate as a result of completing the program.
1. Students can communicate in a single target language at the advanced level or in two target languages at the intermediate level.
 2. Students develop cultural knowledge in at least one region sufficient to explain the significance of that culture's history, art, literature, and/or social customs.
 3. Students develop intercultural competence, understand diverse social and cultural contexts.
 4. Students develop a comparative framework for understanding and appreciating multiple cultures and perspectives.

- 5. Need for the program.** To what specific student, regional, and statewide needs is the institution responding to with the proposed program? How will the proposed program meet those needs? Consider workforce, student, economic, societal, and transfer needs in your response as appropriate. *[250 words]*

Language specific majors require a high number of sequential credits in the target language. If students do not begin their language study in the first year it is often difficult, if not impossible, to complete a language-specific major in four years. Many students do not begin learning a language until their second or third year. This problem is particularly salient among students transferring from institutions that lack foreign language instruction capacities.

Additionally, language students are often interested in comparative studies, which then compounds the challenge of finding a single major that reflects the different languages and cultures that they have studied. This major provides an avenue for students to complete a degree founded in language and cultural studies that goes beyond the traditional single-language major.

Moreover, we face global challenges that transcend the traditional national boundaries and are no longer limited to regions of single cultures or language-speakers. This major better represents the importance of global/transnational cultural awareness and the ability to understand today's challenges from a variety of cultural perspectives.

Finally, a BA in World Languages and Cultures will encourage collaboration between many departments on campus providing language students better access to opportunities in fields that they may not otherwise study.

- 6. Similar programs.** Use the table below to identify and describe the relationship between any similar programs within the Montana University System.

Institution Name	Degree	Program Title
N/A	N/A	N/A

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- a. If the proposed program substantially duplicates another program offered in the Montana University System, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. *[200 words]*

N/A

- b. Describe any efforts that were made to collaborate with similar programs at other institutions. If no efforts were made, please explain why. *[200 words]*

No other university in the MUS system offers this major; however, collaboration efforts are being made to increase on-line and distance education with MUS system schools.

7. Implementation of the program. When will the program be first offered? If implementation will occur in phases, please describe the phased implementation plans. *[100 words]*

The plan is to offer the program for AY20-21.

- a. Complete the following table indicating the projected enrollments in and graduates from the proposed program.

Fall Headcount Enrollment					Graduates				
AY20-21	AY21-22	AY22-23	AY23-24	AY24-25	AY20-21	AY21-22	AY22-23	AY23-24	AY24-25
3-5	3-5	4-7	5-8	7-12	2	2-5	3-5	5-7	5-8

- b. Describe the methodology and sources for determining the enrollment and graduation projections above. *[200 words]*

Current cumulative headcounts of minors in the various programs comprising WLC were used as the foundational data for these estimates. We anticipated some minors continuing on to complete the major and expect some conversion from existing majors, as students who have completed the requirements chose the new major, as it allows additional study in a second language tradition.

- c. What is the initial capacity for the program?

The limit relies on existing courses and faculty.

8. Program assessment. How will success of the program be determined? What action would result if this definition of success is not met? *[150 words]*

The program would be successful if 1) transfer students are accommodated with a shorter time to graduation, 2) students with interest in multiple language traditions are able to graduate, 3) and, students who complete the Certificate in World Competences decided to complete this (or another) major in WLC. If not successful, we will increase advertising of the option to the MUS system and increase communication with advising.

- a. Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program. When will assessment activities occur and at what frequency? *[150 words]*

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Students will be tested in courses to measure how well they can communicate in a single target language at the advanced level or in two target languages at the intermediate level. Students will have opportunities to demonstrate through assignments and projects how well they have developed cultural knowledge in at least one region sufficient to explain the significance of that culture's history, art, literature, and/or social customs. Students performance in in-class and beyond-the-classroom assignments will be used to measure intercultural competence, understand diverse social and cultural contexts. Students comparative work will be used to assess the development of a comparative framework for understanding and appreciating multiple cultures and perspectives.

- b. What direct and indirect measures will be used to assess student learning? *[100 words]*

Exams, daily course work, projects, and research assignments.

- c. How will you ensure that the assessment findings will be used to ensure the quality of the program? *[100 words]*

We will assess evidence-based competencies across the curriculum.

- d. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation. *[100 words]*

Accreditation is not available for this type of major; however, students will be encouraged to seek language skill certifications as available.

9. Physical resources.

- a. Describe the existing facilities, equipment, space, laboratory instruments, computer(s), or other physical equipment available to support the successful implementation of the program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated? *[200 words]*

At present we have classrooms. We do not anticipate the need for additional equipment, space, or facilities. Since all instruction will be provided through preexisting courses that are already being taught students in the major should be accommodated in those classrooms with existing capacity.

- b. List needed facilities, equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. (Enter the costs of those physical resources into the budget sheet.) How will the need for these additional resources be met? *[150 words]*

No additional facilities will be needed.

10. Personnel resources.

- a. Describe the existing instructional, support, and administrative resources available to support the successful implementation of the program. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained? *[200 words]*

Montana Board of Regents
CURRICULUM PROPOSAL FORM

We currently have faculty teaching in each of the languages and cultures available for study. Faculty members may see an increase in student enrollment, which may require additional sections and instructors.

- b. Identify new personnel that must be hired to support the proposed program. (Enter the costs of those personnel resources into the budget sheet.) What are the anticipated sources or plans to secure the needed qualified faculty and staff? *[150 words]*

We will need a portion of an FTE for advising of majors and evaluation of transfer credits. We may also need additional faculty to handle growth in some languages (e.g. Spanish, French, and Japanese). Other languages may exceed current capacity after a few years.

11. Other resources.

- a. Are the available library and information resources adequate for the proposed program? If not, how will adequate resources be obtained? *[100 words]*

Yes.

- b. Do existing student services have the capacity to accommodate the proposed program? What are the implications of the new program on services for the rest of the student body? *[150 words]*

No implications are anticipated.

12. Revenues and expenditures. Describe the implications of the new program on the financial situation of the institution. *[100 words]*

- a. Please complete the following table of budget projections using the corresponding information from the fiscal analysis form for the first three years of operation of the new program.

	Year 1	Year 2	Year 3
Revenues	\$17,955	\$35,909	\$53,864
Expenses	\$0	\$0	\$0
Net Income/Deficit (revenues-expenses)	\$17,955	\$35,909	\$53,864

- b. Describe any expenses anticipated with the implementation of the new program. How will these expenses be met? *[200 words]*

No new expenses are expected.

- i. If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs? *[150 words]*

N/A

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- ii. If an increase in base funding is required to fund the program, indicate the amount of additional base funding and the fiscal year when the institution plans to include the base funding in the department's budget.

N/A

- iii. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? [150 words]

N/A

- iv. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? [150 words]

N/A

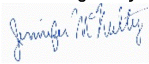
13. Student fees. If the proposed program intends to impose new course, class, lab, or program fees, please list the type and amount of the fee.

N/A

14. Complete the fiscal analysis form.

Signature/Date

College or School Dean:

DocuSigned by:

 1829FE6B3E644DC...

Chief Academic Officer:


Chief Executive Officer:

Flagship Provost*:

DocuSigned by:

 34E1E62599324B7...

Flagship President*:

DocuSigned by:

 9672218F29384DA...

*Not applicable to the Community Colleges.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Appendix A – Proposed New Curriculum

World Languages and Cultures BA -- No Option

Lower Division Core Courses:

Lower Division Language: two years in a single language: Arabic, Chinese, French, German, Greek, Japanese, Latin, Spanish, or Russian.

Lower Division Electives: a total of four courses from the following list of Languages and Culture Courses.

Insert list of any lower-division language courses here

For example:

Languages:

ARAB 101, 102, 201, 202

CHIN 101, 102, 201, 202

FRCH 101, 102, 201, 202

GRK 101, 102, 201, 202

GRMN 101, 102, 201, 202

JPNS 101, 102, 201, 202

LATN 101, 102, 201, 202

RUSS 101, 102, 201, 202

SPNS 101, 102, 201, 202

Cultures:

Montana Board of Regents
CURRICULUM PROPOSAL FORM

ANTY 102, 103, 133, 141, 220, 241?

CLAS 160, 180, 251, 252

GLBD 191

GRMN 106

JPNS 150

RUSS 105

SSEA 202, 234

Upper Division Requirements:

At least 27 upper division credits from the list below. Of these 27 upper division credits, at least 3 upper division credits in a target language and 3 from WLC 380, 381, and 382.

ARAB 305

CHIN 301, 302, 313, 314, 380, 388

CLAS 320, 360, 365

FRCH 300, 301, 302, 310, 311, 312, 313, 338, 339, 350, 420, 430, 440

GRK 300

GRMN 301, 302, 305, 311, 312, 317, 322, 340, 350, 351, 352, 431, 441, 451, 452, 453, 494

HSTR 302, 303, 304

[IRSH 345, 350, 355, 360, 365, 370, 375, 380, 381, 382]

JPNS 301, 302, 306, 311, 371, 411, 415, 431

LATN 311

MCLG 300, 315, 410, 440, 494

RUSS 301, 302, 306, 307, 308 411, 412, 424, 440, 494

SSEA 330, 342, 368

SPNS 301, 302, 305, 306, 308, 321, 326, 331, 355, 359, 400, 408, 432, 465, 466

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Academic Degree Program Proposal - Fiscal Analysis Form

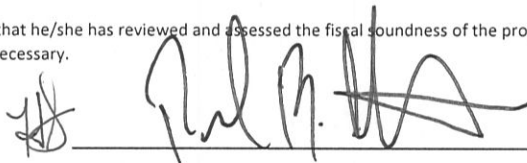
CAMPUS: UM-Missoula
AWARD LEVEL: UG
PROGRAM NAME: B.A., World Languages & Cultures
PROGRAM CODE:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
ENROLLMENT PROJECTIONS					
Headcount					
annual unduplicated headcount of students with declared major or minor within the program	5	10	15	20	20
Credit Hours					
annual avg. credits hours earned per student in program related curriculum	15	15	15	15	15
Student FTE					
Undergrad: (Headcount x CH)/30 Graduate: (Headcount x CH)/24	2.5	5	7.5	10	10
Completions					
Annual number of program completers	0	2	5	7	10

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
REVENUE					
Tuition Revenue (net of waivers)	\$17,955	\$35,909	\$53,864	\$71,819	\$71,819
Institutional Support					
Other Outside Funds (grants, gifts, etc.)					
Program Tuition/Fees					
Total Revenue	\$17,955	\$35,909	\$53,864	\$71,819	\$71,819
Total Revenue per Student FTE	\$7,182	\$7,182	\$7,182	\$7,182	\$7,182

		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
EXPENDITURES						
Tenure Track Faculty	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Non-tenure Track Faculty <small>*Includes Adjunct Instructors</small>	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Graduate Teaching Assistants	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Staff	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Total Faculty & Staff	FTE	0.0	0.0	0.0	0.0	0.0
	Salary + Benefits	\$0	\$0	\$0	\$0	\$0
Operations (supplies, travel, rent, etc)		\$0	\$0	\$0	\$0	\$0
Start-up Expenses (OTO)		\$0	\$0	\$0	\$0	\$0
Total Expenses		\$0	\$0	\$0	\$0	\$0
Student FTE to Faculty (TT + NTT) Ratio		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Net Income/Deficit (Revenue - Expenses)		\$17,955	\$35,909	\$53,864	\$71,819	\$71,819

The signature of the campus Chief Financial Officer signifies that he/she has reviewed and assessed the fiscal soundness of the proposal and provided his/her recommendations to the Chief Academic Officer as necessary.



Campus Chief Financial Officer Signature

Chief Financial Officer Comments

Montana University System
INTENT TO PLAN FORM

Program/Center/Institute Title: B.A. in World Languages and Cultures

Campus, School/Department: University of Montana/ Expected Submission Date: Fall/2020

Contact Name/Info: Jenny McNulty

To increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process, please complete this form not more than 18 months in advance of the anticipated date of submission of the proposed program/center/institute to the Board of Regents for approval. The completed form should not be more than 2-3 pages. For more information regarding the Intent to Plan process, please visit <http://mus.edu/che/arsa/academicproposals.asp>.

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

The BA in World Languages and Cultures is a non-language or culture specific degree that encourages interdisciplinarity or comparative study. This major will supplement the array of language/culture specific options.

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

Language specific majors require a high number of credits in the target language. Frequently, students do not begin learning a language until their second or third year. This problem is particularly salient among students transferring from institutions that lack foreign language instruction capacities. If they do not begin their language study in the first year, it is often difficult, if not impossible to complete a language-specific major in four years. Additionally, language students are often interested in comparative studies, which then compounds the challenge of finding a single major that reflects the different languages and cultures that they have studied. This major provides an avenue for students to

complete a degree founded in language and cultural studies that goes beyond the traditional single-language major. Moreover, we face global challenges that transcend the traditional national boundaries and are no longer limited to regions of single cultures or language-speakers. This major better represents the importance of global cultural awareness and the ability to understand today's challenges from a variety of cultural perspectives. Finally, a BA in World Languages and Cultures will encourage collaboration between many departments on campus providing language students better access to opportunities in fields that they may not otherwise study.

The BA in World Languages and Cultures will build on the newly established World Competencies Certificate by creating another tier to a system of stackable credentials. This degree will also allow students (1) who begin studying languages and cultures late in their academic careers to complete a major which emphasizes a combination of languages and cultures, (2) who are interested in comparative approaches to language and cultural studies, and (3) who are unable to complete a language-specific major to still complete a major utilizing the credits earned in language-specific disciplines.

3) Describe how the program/center/institute fits with the institutional mission, strategic plan, and existing institutional program array.

This major will rely on courses already existing in the UM course catalog. No additional instructional resources will be necessary.

Montana University System
INTENT TO PLAN FORM

This BA is an opportunity to encourage students throughout MUS to study languages not available at their home institutions.

- 4) Describe how the program/center/institute overlaps, complements, or duplicates existing efforts in the MUS. Describe efforts that will be made to collaborate with similar programs at other institutions. If no efforts will be made, please explain why.


The World Languages and Cultures department is unique in the MUS. There are no other majors in the system that allow students to combine the study of multiple languages and cultures into a single BA.

Signature/Date

College/School Dean: 

Chief Academic Officer:

Chief Executive Officer:

Flagship Provost*: 

Flagship President*: 

*Not applicable to the Community Colleges.

Date of Final Review:

When submitting the proposal to the BOR, include this signed form with the Level II request.

January 2020

ITEM 186-1501-R0120

Request for authorization to establish a Statistics option in the existing B.S. Mathematical Sciences major

THAT

Montana Technological University requests authorization from the Montana Board of Regents to establish a Statistics option in the existing Mathematics major.

EXPLANATION

Currently the department offers a B.S. in Mathematical Sciences with options in Pure Math and Applied math. We propose adding a third option to the existing Mathematics major. This new option will be in Statistics which includes two classes on data science.

ATTACHMENTS

Curriculum Proposal Form
Proposal Request Form
Intent to Plan

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

ITEM 186-1501-R0120 Submission Month or Meeting: January 2020

Institution: Montana Technological University CIP Code: 27.0301

Program/Center/Institute Title: B.S. in Mathematics, Statistics Option

Includes (please specify below): Online Offering Options

Please mark the appropriate type of request and submit with an Item Template and any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/academicproposals.asp>.

 A. Level I:

Campus Approvals

- 1a. **Placing a postsecondary educational program into moratorium** (Program Termination and Moratorium Form)
- 1b. **Withdrawing a postsecondary educational program from moratorium**
- 2. **Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less**
- 3. **Establishing a B.A.S./A.A./A.S. area of study**
- 4. **Offering an existing postsecondary educational program via distance or online delivery**

OCHE Approvals

- 5. **Re-titling an existing postsecondary educational program**
- 6. **Terminating an existing postsecondary educational program** (Program Termination and Moratorium Form)
- 7. **Consolidating existing postsecondary educational programs** (Curriculum Proposal Form)
- 8. **Establishing a new minor where there is a major or an option in a major** (Curriculum Proposal Form)
- 9. **Revising a postsecondary educational program** (Curriculum Proposal Form)
- 10. **Establishing a temporary C.A.S. or A.A.S. degree program** *Approval limited to 2 years*

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

X **B. Level II:**

- X **1. Establishing a new postsecondary educational program** (Curriculum Proposal and Completed Intent to Plan Form)
- 2. Permanent authorization for a temporary C.A.S. or A.A.S degree program** (Curriculum Proposal and Completed Intent to Plan Form)
- 3. Exceeding the 120 credit maximum for baccalaureate degrees** *Exception to policy 301.11*
- 4. Forming, eliminating or consolidating an academic, administrative, or research unit** (Curriculum or Center/Institute Proposal and Completed Intent to Plan Form, except when eliminating or consolidating)
- 5. Re-titling an academic, administrative, or research unit**

Proposal Summary [360 words maximum]

What: Montana Technological University requests authorization from the Montana Board of Regents to establish a Statistics option in the existing Mathematics major.

Why: The Montana Tech Mission statement describes the university’s commitment to “exemplary undergraduate and graduate education ... that blends theory with practice”. Statistics uses theory from both mathematics and other disciplines to solve real world problems. Statistics can be used in a wide variety of disciplines and is used wherever data is collected. The Montana Tech Strategic Plan emphasizes the commitment of the university to “[o]ffer courses and programs that enable students to acquire knowledge and skills essential to employment and success in their field and profession”. The Statistics program has been designed to meet this goal. Statisticians work in many different fields including science, technology, business and government. In order to ensure that our graduates will have the necessary skills for applying statistical methods to solve problems in a wide variety of disciplines, we have designed a degree that covers a wide range of statistical methods that are currently being used in analyzing data collected in science, technology, business, industry, and government.

Resources: Current faculty are already teaching courses needed for this option.

Relationship to similar MUS programs: Both the University of Montana and Montana State University offer Statistics options.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- 1. Overview of the request and resulting changes.** Provide a one-paragraph description of the proposed program. Will this program be related or tied to other programs on campus? Describe any changes to existing program(s) that this program will replace or modify. *[100 words]*

Currently the department offers a B.S. in Mathematical Sciences with options in Pure Math and Applied math. We propose adding a third option to the existing mathematics major. This new option will be in Statistics which includes two classes on data science.

- 2. Relation to institutional strategic goals.** Describe the nature and purpose of the new program in the context of the institution's mission and core themes. *[200 words]*

The Montana Tech Mission statement describes the university's commitment to "exemplary undergraduate and graduate education ... that blends theory with practice".¹ Statistics uses theory from both mathematics and other disciplines to solve real world problems. Statistics can be used in a wide variety of disciplines and is used wherever data is collected. The Montana Tech Strategic Plan emphasizes the commitment of the university to "[o]ffer courses and programs that enable students to acquire knowledge and skills essential to employment and success in their field and profession".² The Statistics program has been designed to meet this goal. Statisticians work in many different fields including science, technology, business and government. In order to ensure that our graduates will have the necessary skills for applying statistical methods to solve problems in a wide variety of disciplines, we have designed a degree that covers a wide range of statistical methods that are currently being used in analyzing data collected in science, technology, business, industry, and government.

- 3. Process leading to submission.** Briefly detail the planning, development, and approval process of the program at the institution. *[100 words]*

In 2000 an option in Statistics was added to the Mathematical Sciences program. In 2011, Statistics became a stand-alone degree program and the Statistics faculty separated from the Department of Mathematical Sciences. When Montana Tech began developing a program prioritization plan for restructuring, the Statistics faculty were merged back into the Department of Mathematical Sciences and the stand-alone Statistics was eliminated with plans for Statistics to become an option under the B.S. degree in Mathematical Sciences. No faculty nor courses were eliminated in the restructuring, and in fact, all of the statistics courses required in the Statistics major were required to be kept intact for the B.S. in Data Science. The curriculum for the new option was developed by the Department of Mathematical Sciences in the spring of 2019, and approved in April of 2019 by the Montana Tech Curriculum Review Committee and by the Faculty Senate. The Intent to Plan proposal was discussed at the CAO call in October of 2019.

- 4. Program description.** Please include a complete listing of the proposed new curriculum in Appendix A of this document.

- a. List the program requirements using the following table.

¹ <http://www.mtech.edu/about/>

² <http://www.mtech.edu/about/strategic-plan/core-themes.htm>

Montana Board of Regents
CURRICULUM PROPOSAL FORM

a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program M 171 – Calculus 1 (3 credits) M 172 – Calculus 2 (3 credits) M 242 – Methods of Proof (3 credits) M 273 – Multivariable Calculus (4 credits) M 274 – Introduction to Differential Equations (3 credits) M 333 – Linear Algebra (3 credits) M 435W – Advanced Calculus I (3 credits) STAT 332 – Statistics for Scientists and Engineers (3 credits) STAT 421 – Probability Theory (3 credits) STAT 422 – Mathematical Statistics (3 credits) STAT 432 – Regression and Model Building (3 credits) STAT 435 – Statistical Computing and EDA (3 credits) STAT 441 – Experimental Design (3 credits) STAT 453 – Statistical Learning and Data Science I (3 credits) STAT 454 – Statistical Learning and Data Science II (3 credits) STAT 456 – Bayesian Statistical Inference (3 credits)	46
Credits in required courses offered by other departments A course in computer programming (3 credits) A sequence of science courses including a laboratory course (7-8 credits) 4 300/400 level courses from another math/science discipline (12 credits) First year seminar (1-2 credits) Junior or senior seminar (1-2 credits)	30-33
Credits in institutional general education curriculum 2 social sciences courses (6 credits) 2 humanities courses (6 credits) 2 communications courses (6 credits)	18
Credits of free electives	26
Total credits required to complete the program	120-123

b. List the program learning outcomes for the proposed program. Use learner-centered statements that indicate what students will know, be able to do, and/or value or appreciate as a result of completing the program.

- Students should have an ability to identify, formulate, and solve data analytic problems using the appropriate statistical methods.
- Students should be able to communicate a well-organized summary of a statistical analysis.
- Students should be able to design an appropriate sampling plan for the problem at hand.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

- 5. Need for the program.** To what specific student, regional, and statewide needs is the institution responding to with the proposed program? How will the proposed program meet those needs? Consider workforce, student, economic, societal, and transfer needs in your response as appropriate. *[250 words]*

According to the Society for Industrial and Applied Mathematics, statisticians make up approximately half of the mathematicians working in business and industry³. The demand for statisticians in business and industry is expected to grow 21 percent from 2014 to 2024.⁴ The Bureau of Labor Statistics states that “[b]usinesses will need statisticians to analyze the increasing volume of digital and electronic data”⁵. The Statistics option with its emphasis on data science will make graduates with the Statistics option extremely employable. The high demand for statisticians and data scientists makes the Statistics option in Mathematical Sciences one of the most employable and highest paying college majors.

- 6. Similar programs.** Use the table below to identify and describe the relationship between any similar programs within the Montana University System.

Institution Name	Degree	Program Title
University of Montana	B.A.	Statistics Option
Montana State University	B.S.	Statistics Option

- a. If the proposed program substantially duplicates another program offered in the Montana University System, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. *[200 words]*

The Statistics option is of interest, because of the high demand for statisticians and data scientists. The Statistics option has been designed to prepare students for job opportunities in both statistics and data science.

- b. Describe any efforts that were made to collaborate with similar programs at other institutions. If no efforts were made, please explain why. *[200 words]*

³ <https://www.siam.org/reports/mii/2012/life.php>

⁴ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Mathematicians, on the Internet at <http://www.bls.gov/ooh/math/mathematicians.htm> (visited August 24, 2017).

⁵ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Mathematicians, on the Internet at <http://www.bls.gov/ooh/math/mathematicians.htm> (visited August 24, 2017).

Montana Board of Regents

CURRICULUM PROPOSAL FORM

We are not planning on collaborating with any similar programs at other institutions. Since this program requires no additional courses to be developed, nor any new faculty members to be hired, it was not necessary to collaborate with other Montana institutions. However, where appropriate collaborations present themselves, we would evaluate the potential of these collaborations.

- 7. Implementation of the program.** When will the program be first offered? If implementation will occur in phases, please describe the phased implementation plans. *[100 words]*

Because the program requires no additional courses to be developed and no additional faculty hires, full implementation of the option can begin in the fall of 2020.

- a. Complete the following table indicating the projected enrollments in and graduates from the proposed program.

Fall Headcount Enrollment					Graduates				
AY_20__	AY_21__	AY_22__	AY_23__	AY_24__	AY_20__	AY_21__	AY_22__	AY_23__	AY_24__
3	3	5	5	7	0	3	3	5	7

- b. Describe the methodology and sources for determining the enrollment and graduation projections above. *[200 words]*

We have 5 current students seeking degree in Statistics under the stand-alone degree that was eliminated in 2019. Two current math students intend to pursue the Statistics Option if it is approved. We used these students to estimate the initial number of students that we will enroll in the program. We then used historical enrollment data to estimate the approximate growth of the program. From 2012-2017, we had an average of 4.2 students graduate with the Statistics degree; the number in these five years were 6, 5, 5, 1, 4. Based on this data, we anticipate that by AY24, we will have approximately 15 students that will be enrolled in our Statistics option

- c. What is the initial capacity for the program?

The initial capacity for the program is approximately 50 students (10 first year, 10 sophomores, 15 juniors, and 15 seniors).

- 8. Program assessment.** How will success of the program be determined? What action would result if this definition of success is not met? *[150 words]*

The success of the program will be determined using the number of graduates in the first five years of the program Our goal is to have at least 5 graduates in the first 5 years of the program. If we do not meet the goal for the number of graduates, we increase our recruiting efforts for two years. If we are not able to increase the number of students enrolling in the Statistics option, we will seek to terminate the program.

- a. Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program. When will assessment activities occur and at what frequency? *[150 words]*

Montana Board of Regents
CURRICULUM PROPOSAL FORM

The department assess the student outcomes of our current program each year in our annual program review. Data are collected each year from our graduating seniors. This data comes from a variety of sources, including student self-reports, surveys of current students and alumnae, annual graduation survey results compiled by Career Services, standardized exams like the ETS Proficiency Exam, and grades in key courses within the program.

- b. What direct and indirect measures will be used to assess student learning? *[100 words]*

The direct measures of student learning will include the ETS Proficiency Exam, grades in select courses within the program, and capstone projects completed. Indirect measures will include course evaluations and surveys of both current students and recent graduates.

- c. How will you ensure that the assessment findings will be used to ensure the quality of the program? *[100 words]*

The department analyzes the findings from the program review each year in order to make needed revisions to our program. We are seeking to create the Statistics Option in response to data from one of our program reviews. The survey of both alumnae and students conducted in 2015 revealed the need for an option that provided specific preparation needed for a career in business, industry, or government.

- d. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation. *[100 words]*

Mathematics programs do not have a separate or specialized accrediting body. Therefore, we will not seek a specialized accreditation for our program.

9. Physical resources.

- a. Describe the existing facilities, equipment, space, laboratory instruments, computer(s), or other physical equipment available to support the successful implementation of the program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated? *[200 words]*

The Mathematical Sciences department has eight offices. These offices are the only spaces that are used exclusively by the department. Since the new option does not require the creation of any new courses, an increase the frequency of needed course offerings, or an increase in staffing we do not anticipate any additional facilities, equipment, space, laboratory instruments, etc. that will be needed to support the program.

- b. List needed facilities, equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. (Enter the costs of those physical resources into the budget sheet.) How will the need for these additional resources be met? *[150 words]*

Since the new option does not require the creation of any new courses or increase the frequency of needed course offerings, we do not anticipate any additional facilities, equipment, space, laboratory instruments, etc. that will be needed to support the program.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

10. Personnel resources.

- a. Describe the existing instructional, support, and administrative resources available to support the successful implementation of the program. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained? *[200 words]*

Currently, the Department of Mathematical Sciences includes 9 full-time faculty members. Two faculty members are instructors and teach primarily the service courses (e.g. college algebra, Calculus) offered by the department. The remaining seven faculty members are research active faculty; three of the seven faculty hold doctorates in Statistics. The Statistics faculty teach a mix of service courses and courses for the existing mathematics major and data science major. The upper level statistics courses that will count towards the degree had an average enrollment of 9 students from the fall semester of 2011 until the spring semester of 2019. The additional 10 students each year will be accommodated into the existing courses without any need to increase the number of sections or the frequency with which these sections are offered.

- b. Identify new personnel that must be hired to support the proposed program. (Enter the costs of those personnel resources into the budget sheet.) What are the anticipated sources or plans to secure the needed qualified faculty and staff? *[150 words]*

Since the new option does not require the creation of any new courses or increase the frequency of needed course offerings, we do not anticipate any additional personnel will be needed to support the program.

11. Other resources.

- a. Are the available library and information resources adequate for the proposed program? If not, how will adequate resources be obtained? *[100 words]*

Since the new option will not require the creation of new courses, there should be no need for additional library or information resources.

- b. Do existing student services have the capacity to accommodate the proposed program? What are the implications of the new program on services for the rest of the student body? *[150 words]*

Since the courses already exist and are just being arranged to provide another career avenue for students there will be no change in our student services capacity to accommodate the student body.

12. Revenues and expenditures. Describe the implications of the new program on the financial situation of the institution. *[100 words]*

This will only enhance the financial situation since we are not adding any additional courses. It will allow students to either major in the program or obtain a second major which allows us to increase credit hour production.

Montana Board of Regents

CURRICULUM PROPOSAL FORM

- a. Please complete the following table of budget projections using the corresponding information from the budget template for the first three years of operation of the new program.

	Year 1	Year 2	Year 3
Revenues	\$22,296	\$22,296	\$37,160
Expenditures	-0-	-0-	-0-
Net Revenue (revenues-expenditures)	\$22,296	\$22,296	\$37,160

- b. Describe any expenses anticipated with the implementation of the new program. How will these expenses be met? *[200 words]*

Since the courses already exist there will be no additional expense.

- i. If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs? *[150 words]*

N/A

- ii. If an increase in base funding is required to fund the program, indicate the amount of additional base funding and the fiscal year when the institution plans to include the base funding in the department's budget.

N/A

- iii. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? *[150 words]*

N/A

- iv. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? *[150 words]*

N/A

- 13. Student fees.** If the proposed program intends to impose new course, class, lab, or program fees, please list the type and amount of the fee.

No additional student fees will be imposed.

- 14. Complete the budget template below with the following information:**

- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program.
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Amounts should reconcile subsequent pages where budget explanations are provided.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

Signature/Date

College or School Dean:  11/25/19

Chief Academic Officer: Douglas M. Albatt 11/25/19

Chief Executive Officer:  11/25/19

Flagship Provost*: N/A

Flagship President*: N/A

*Not applicable to the Community Colleges.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

I. PROJECTED STUDENT ENROLLMENT

	FY <u>21</u>		FY <u>22</u>		FY <u>23</u>	
	FTE	Headcount	FTE	Headcount	FTE	Headcount
Projected enrollments	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>5</u>	<u>5</u>

II. REVENUE

	FY <u>21</u>		FY <u>22</u>		FY <u>23</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
2. Institution Funds	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
3. Federal	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
4. New Tuition Revenues from Increased Enrollments	<u>17,124</u>	<u>0</u>	<u>17,124</u>	<u>0</u>	<u>28,540</u>	<u>0</u>
5. Student Fees	<u>5,172</u>	<u>0</u>	<u>5,172</u>	<u>0</u>	<u>8,620</u>	<u>0</u>
6. Other (i.e., Gifts)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Revenue	<u>\$22,296</u>	<u>\$0</u>	<u>\$22,296</u>	<u>\$0</u>	<u>\$37,160</u>	<u>\$0</u>

*Ongoing is defined as ongoing operating budget for the program which will become part of the base.
One-time is defined as one-time funding in a fiscal year and not part of the base.*

III. EXPENDITURES N/A

	FY _____		FY _____		FY _____	
	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs						
1. FTE	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
2. Faculty	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
3. Adjunct Faculty	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
4. Graduate/Undergrad Assistants	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
5. Research Personnel	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Montana Board of Regents
CURRICULUM PROPOSAL FORM

6. Directors/Administrators	_____	_____	_____	_____	_____	_____
7. Administrative Support Personnel	_____	_____	_____	_____	_____	_____
8. Fringe Benefits	_____	_____	_____	_____	_____	_____
9. Other: _____	_____	_____	_____	_____	_____	_____
Total Personnel and Costs	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>

	FY _____		FY _____		FY _____	
	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures						
N/A						
1. Travel	_____	_____	_____	_____	_____	_____
2. Professional Services	_____	_____	_____	_____	_____	_____
3. Other Services	_____	_____	_____	_____	_____	_____
4. Communications	_____	_____	_____	_____	_____	_____
5. Materials and Supplies	_____	_____	_____	_____	_____	_____
6. Rentals	_____	_____	_____	_____	_____	_____
7. Materials & Goods for Manufacture & Resale	_____	_____	_____	_____	_____	_____
8. Other: _____	_____	_____	_____	_____	_____	_____
Total Operating Expenditures	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>

	FY _____		FY _____		FY _____	
	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay						
N/A						
1. Library Resources	_____	_____	_____	_____	_____	_____
2. Equipment	_____	_____	_____	_____	_____	_____
Total Capital Outlay	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>	<u><u>\$0</u></u>

Montana Board of Regents
CURRICULUM PROPOSAL FORM

	On-going	One-time	On-going	One-time	On-going	One-time
D. Capital Facilities Construction or Major Renovation	_____	_____	_____	_____	_____	_____
	FY _____		FY _____		FY _____	
E. Other Costs N/A	On-going	One-time	On-going	One-time	On-going	One-time
1. Utilities	_____	_____	_____	_____	_____	_____
2. Maintenance & Repairs	_____	_____	_____	_____	_____	_____
3. Other: _____	_____	_____	_____	_____	_____	_____
Total Other Costs	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL EXPENDITURES:	\$0	\$0	\$0	\$0	\$0	\$0
Net Income (Deficit)	\$22,296	\$0	\$22,296	\$0	\$37,160	\$0

The signature of the campus Chief Financial Officer signifies that he/she has reviewed and assessed the fiscal soundness of the proposal and provided his/her recommendations to the Chief Academic Officer as necessary.



Campus Chief Financial Officer Signature

Chief Financial Officer comments:

Appendix A – Proposed New Curriculum

Option in Statistics

Name: _____

2020 - 2021

Fall Semester				Spring Semester					
			Credit	Sem	Grade		Credits		
FRESHMAN YEAR									
M	171	Calculus I	3	_____	_____	M	172	Calculus II	3
STAT	216	Introduction to Statistics	3	_____	_____	*		Science Elective	3
M	194	New Major Seminar in Mathematical Sciences	1	_____	_____			General Elective	3
WRIT	101	College Writing I	3	_____	_____	**		General Elective	3
COMX	111	Intro to Public Speaking OR	3	_____	_____	**		General Elective	3
COMX	211	Adv. Public Speaking	3	_____	_____				3
			<i>Total Credits</i>	13					

SOPHOMORE YEAR									
M	242	Methods of Proof	3	_____	_____	M	274	Intro. To Diff. Equations	3
M	273	Multivariable Calculus	4	_____	_____	M	333	Matrices & Linear Algebra	3
STAT	332	Statistics for Scientists & Engineers	3	_____	_____	M	323	Methods of Proof II	3
*		Science Elective	3	_____	_____	STAT	435	Statistical Computing & EDA	3
**		General Elective	3	_____	_____	STAT	432	Regression & Model Building	3
			<i>Total Credits</i>	16					

JUNIOR YEAR									
STAT	421	Probability Theory	3	_____	_____	STAT	422	Mathematical Statistics	3
M	435W	Advanced Calculus I	3	_____	_____	STAT	454	Stat Learning & Data Sci II	3
STAT	453	Stat Learning & Data Sci I	3	_____	_____	**		General Elective	3
**		General Elective	3	_____	_____	**		General Elective	3
**		General Elective	3	_____	_____	**		General Elective	3
			<i>Total Credits</i>	15					

SENIOR YEAR									
STAT	441	Experimental Design	3	_____	_____	STAT	456	Bayesian Statistical Inference	3
M	3xx/4	Mathematics Elective	3	_____	_____	**		General Elective	3
**		General Elective	3	_____	_____	**		General Elective	3
**		General Elective	3	_____	_____	**		General Elective	3
**		General Elective	1	_____	_____	**		General Elective	3
			<i>Total Credits</i>	16					

B.S. degree in Statistics = 120

* Science Electives must include at least one semester of laboratory science, either (1) BIOB 101 with lab BIOB 102, BIOB 160 with lab BIOB 161, BIOC 235, or BIOH 201/202; (2) CHMY 141 with lab CHMY 142; (3) GEO 101 with lab GEOE 104 or GEO 209; or (4) PHSX 234 and PHSX 235 with lab PHSX 236.

** Electives must be chosen so that the Gen. Ed. Requirements in the Communication Core, Humanities Core, Physical and Life Sciences Core, and Social Sciences Cores are met.

The STAT 421(F), 422(S), 453(F), 454(S), and 456(S) are offered on alternate year basis.

Montana University System
INTENT TO PLAN FORM

Program/Center/Institute Title: **BS in Mathematics, Statistics option**

Campus, School/Department: **Montana Technological University, CLSPS,
Mathematical Sciences**

Expected Submission Date: **11/2019**

Contact Name/Info: **Dr. Rick Rossi (rrossi@mtech.edu) Dr. Hilary Smith Risser (hrisser@mtech.edu)**

To increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process, please complete this form not more than 18 months in advance of the anticipated date of submission of the proposed program/center/institute to the Board of Regents for approval. The completed form should not be more than 2-3 pages. For more information regarding the Intent to Plan process, please visit <http://mus.edu/che/arsa/academicproposals.asp>.

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

The statistics option will replace a standalone degree in Statistics that was placed into moratorium. The majority of the existing statistics courses were added to the degree in Mathematical Sciences over 15 years ago in order to respond to the American Mathematical Society recommendations for undergraduate training in mathematics. The three courses Statistical Learning and Data Science I, Statistical Learning and Data Science II, and Bayesian Statistical Inference were added in 2017 to address the need for training in data science.

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

Job forecasts have statistician as one of the top 10 jobs for demand and growth in the next decade. As business, industry, and government agencies collect and generate exponentially more data, the need for well-trained data analysts (i.e., statisticians) to collect and analyze data will grow also. In fact, the Bureau of Labor Statistics reports that the demand for statisticians is expected to grow by 33% from 2016 to 2026.

US News rated statistician as the number 2 job in America for 2019 because “When businesses and government agencies need help making sophisticated decisions and solving complicated problems, they turn to statisticians.”

USA Today has named statistician as the number 5 top job in America in 2019 for its “very good work environment, very low stress at work, and very good projected employment growth – making it one of very few careers to receive the highest marks available for all three categories.”

Data science, which is primarily statistical analysis, offers tremendous job opportunities for graduates trained in statistics. There is tremendous demand and high paying jobs for data scientists trained in statistics.

3) Describe how the program/center/institute fits with the institutional mission, strategic plan, and existing institutional program array.

Currently the department offers two tracks. One option prepares students that wish to pursue a career in applied mathematics, and the other option prepares students that wish to attend graduate school in the

Montana University System
INTENT TO PLAN FORM

mathematical sciences. We propose adding a third option to the existing mathematics major in statistics that will offer students outstanding job opportunities and the chance to attend graduate school in a program in statistics or data science. The proposed Statistics option is in alignment with the Montana Tech Strategic Plan and the Montana Tech Mission Statement.

- 4) Describe how the program/center/institute overlaps, complements, or duplicates existing efforts in the MUS. Describe efforts that will be made to collaborate with similar programs at other institutions. If no efforts will be made, please explain why.

Both The University of Montana and Montana State University offer statistics options.

Signature/Date

College/School Dean:  9/18/19

Chief Academic Officer: Douglas M. Albatt 9/18/19

Chief Executive Officer:  9/19/19

Flagship Provost*: N/A

Flagship President*: N/A

*Not applicable to the Community Colleges.

Date of Final Review:

When submitting the proposal to the BOR, include this signed form with the Level II request.

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

April 2020

ITEM 188-1505-R0520

Request for authorization to rename the Department of Business and Information Technology to the Department of Business

Institution: **Montana Technological University**

CIP Code: **52**

Program/Center/Institute Title: **Department of Business and Information Technology**

Includes (please specify below): Face-to-face Offering: _____ Online Offering: _____ Blended Offering: _____

Options: _____

Proposal Summary [360 words maximum]

What: The College of Letters, Sciences, and Professional Studies of the Montana Technological University respectfully requests authorization from the Montana Board of Regents to change the name of the Department of Business and Information Technology. The Department is seeking to become the Department of Business, effectively removing Information Technology from its current name.

Why: Montana Tech implemented a bachelor of science in Business and Information Technology in the mid-1990s as a way to differentiate itself from other business degrees in the state. The newly formed Department adopted the same name at this time. The name of both the degree and the department were seen as a way to differentiate our program from other business programs in the state.

It is the belief of the Department that the current name of the Department is confusing to potential students. It is believed the inclusion of Information Technology in the Department's name may lead to the conclusion that Montana Tech does not provide a four-year business degree that can be directly compared to other four-year business programs in the state. In summary, as prospective students search for prospective business programs, the current Department name, and specifically the inclusion of the word Technology, may lead these individuals to dismiss our program as a non-four-year degree as the word Technology is commonly used in the two-year associate of applied science degrees on the campus.

This proposal is a request to change the name of the Department only. We have no inclination, at this time, to change the name of the bachelor of science degree from Business and Information Technology.

Resources: No additional resources are required.

ATTACHMENTS

n/a

Please mark the appropriate type of request and submit with any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/academicproposals.asp>.

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

 A. Level I:

Campus Approvals

 1a. Placing a postsecondary educational program into moratorium (Program Termination and Moratorium Form)

 1b. Withdrawing a postsecondary educational program from moratorium

 2. Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less

 3. Establishing a B.A.S./A.A./A.S. area of study

 4. Offering an existing postsecondary educational program via distance or online delivery

OCHE Approvals

 5. Re-titling an existing postsecondary educational program

 6. Terminating an existing postsecondary educational program (Program Termination and Moratorium Form)

 7. Consolidating existing postsecondary educational programs (Curriculum Proposal Form)

 8. Establishing a new minor where there is a major or an option in a major (Curriculum Proposal Form)

 9. Revising a postsecondary educational program (Curriculum Proposal Form)

 10. Establishing a temporary C.A.S. or A.A.S. degree program *Approval limited to 2 years*

 x **B. Level II:**

 1. Establishing a new postsecondary educational program (Curriculum Proposal and Completed Request to Plan Form)

 2. Permanent authorization for a temporary C.A.S. or A.A.S degree program (Curriculum Proposal and Completed Request to Plan Form)

 3. Exceeding the 120-credit maximum for baccalaureate degrees *Exception to policy 301.11*

 4. Forming, eliminating or consolidating an academic, administrative, or research unit (Curriculum or Center/Institute Proposal and completed Request to Plan, except when eliminating or consolidating)

 x **5. Re-titling an academic, administrative, or research unit**

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

April 2020

ITEM 188-1507-R0520

Request for authorization to rename an the Liberal Studies Department the Department of Interdisciplinary Arts and Sciences

Institution: Montana Technological University

CIP Code: 24.0101

Program/Center/Institute Title: Liberal Studies

Includes (please specify below): Face-to-face Offering: X Online Offering: _____ Blended Offering: _____

Options: _____

Proposal Summary [360 words maximum]

What: Montana Tech requests authorization from the Montana Board of Regents to rename the Liberal Studies Department to the Department of Interdisciplinary Arts and Sciences.

Why: The Liberal Studies department currently houses faculty members teaching Anthropology, Communication, History, Literature, Media Arts, Psychology, Sociology, and Writing. Due to a reorganization mandated by the campus program prioritization, faculty members from the Professional and Technical Communication department are now housed within the Liberal Studies department. Because of these diverse fields, along with a common misperception and misunderstanding of the adjective "Liberal" the department proposes to rename the department Interdisciplinary Arts and Science.

This name was chosen because it better encapsulates the diverse fields taught by departmental faculty. Additionally, this departmental name will match our current major as part of a Montana Tech B.S. degree (a future request will propose renaming our B.A.S. degree). In this selection process the department also sought feedback from alumni, alumnae, and current students on the renaming process. A handful of current students provided the attached feedback.

Resources: No addition resources are needed.

ATTACHMENTS

n/a

Please mark the appropriate type of request and submit with any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/academicproposals.asp>.

 A. Level I:

Montana Board of Regents
ACADEMIC PROPOSAL REQUEST FORM

Campus Approvals

_____ **1a. Placing a postsecondary educational program into moratorium** (Program Termination and Moratorium Form)

_____ **1b. Withdrawing a postsecondary educational program from moratorium**

_____ **2. Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less**

_____ **3. Establishing a B.A.S./A.A./A.S. area of study**

_____ **4. Offering an existing postsecondary educational program via distance or online delivery**

OCHE Approvals

_____ **5. Re-titling an existing postsecondary educational program**

_____ **6. Terminating an existing postsecondary educational program** (Program Termination and Moratorium Form)

_____ **7. Consolidating existing postsecondary educational programs** (Curriculum Proposal Form)

_____ **8. Establishing a new minor where there is a major or an option in a major** (Curriculum Proposal Form)

_____ **9. Revising a postsecondary educational program** (Curriculum Proposal Form)

_____ **10. Establishing a temporary C.A.S. or A.A.S. degree program** *Approval limited to 2 years*

X **B. Level II:**

_____ **1. Establishing a new postsecondary educational program** (Curriculum Proposal and Completed Request to Plan Form)

_____ **2. Permanent authorization for a temporary C.A.S. or A.A.S degree program** (Curriculum Proposal and Completed Request to Plan Form)

_____ **3. Exceeding the 120-credit maximum for baccalaureate degrees** *Exception to policy 301.11*

_____ **4. Forming, eliminating or consolidating an academic, administrative, or research unit** (Curriculum or Center/Institute Proposal and completed Request to Plan, except when eliminating or consolidating)

X _____ **5. Re-titling an academic, administrative, or research unit**

Below is an image of the survey sent for feedback on the departmental name change. The survey was open for 15 days in early January.

Because the faculty of the Professional and Technical Communication Department and the Liberal Studies Department are now housed together, we are considering names for the department and would like your input. We are currently considering the name "*Interdisciplinary Arts and Sciences*" to match the name of one of our majors. Please provide your thoughts on this name below.

What is your reaction to this name for a combined department?

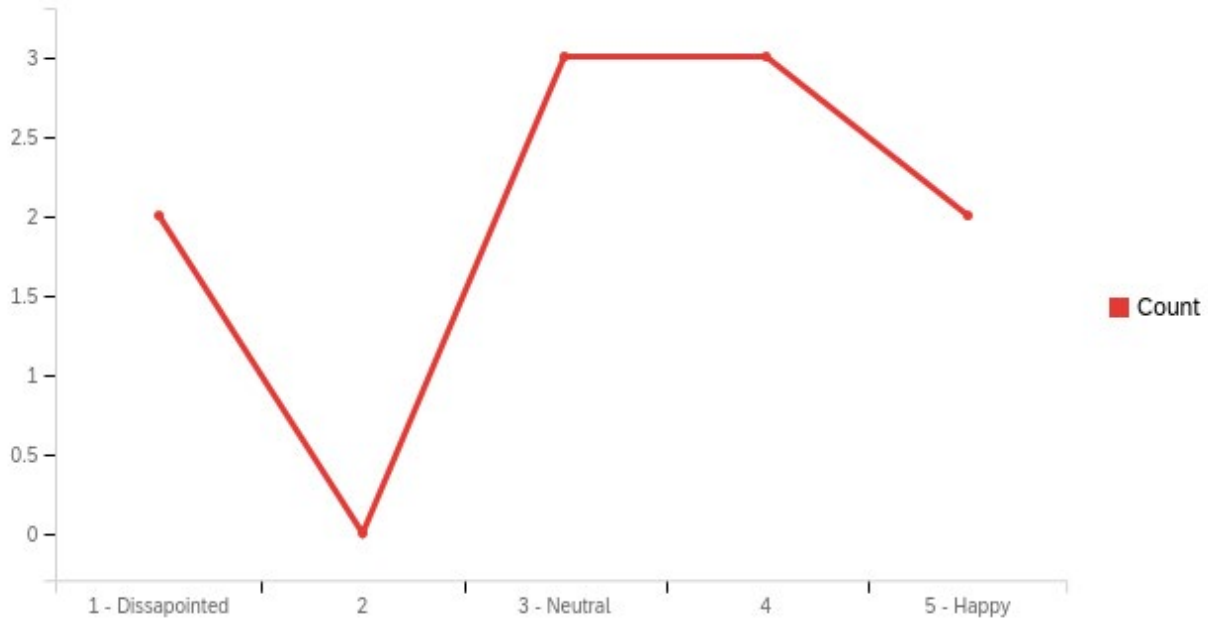


Please provide your comments on this name (or others).

What is your primary relationship to the PTC, LS, IAS, or S&T programs?

- Current Student
- Alumnus / Alumna
- Employer
- Parent of student or alum
- Other:

Reaction feedback:



Mean = 3.30 (Neutral)

Anonymous Comments:

“It feels like a copout, vaguely synonymous way of saying "Liberal Arts." Nobody is going to buy it as a different kind of program with that thin veneer of difference.”

“The Professional and Technical Communication department is so much more than just "Interdisciplinary Arts and Sciences" and reducing the program to this name is a slap in the face to the faculty and staff that were once proud to be a part of the department.”

“Having the name of the department match the name of the degree program would probably be beneficial regarding recognition and enrollment, but I think the department should revert back to its old name, “Humanities and Social Sciences”, while offering the IAS degree. Also, consider bringing back the “Society and Technology” name for a degree program and/or option. I think it would go over well considering our recent designation as a “special focus” STEM university.”

“While I like that this name implies a science aspect to the degree, and will set us apart from other people in similar departments while we are looking for employment, I feel that it may be misleading. What arts will the department be offering? For that matter, what sciences?”

Relationship to Department:

10 (100%) Current Students