

## LEVEL II MEMORANDUM

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**DATE:** Wednesday, August 2, 2017

**TO:** Chief Academic Officers, Montana University System

**FROM:** John Cech, Deputy Commissioner for Academic and Student Affairs

**RE:** September Level II Proposals

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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 August 30. Issues not resolved at that meeting should be submitted in writing to OCHE by noon on Friday, September 1. If no concerns are received, OCHE will assume that the proposals have your approval.

### Level II Items

#### **Montana State University Bozeman:**

- Request for authorization to offer a B.A. degree in Computer Science  
[Item # 176-2010-R0917](#) | [Academic Proposal Request Form](#) | [Curriculum Proposal Form](#) | [Intent to Plan](#) | [Attachment # 1-Letter of Support](#)
- Request for authorization to re-establish a PhD in Electrical Engineering  
[Item # 176-2011-R0917](#) | [Academic Proposal Request Form](#) | [Curriculum Proposal Form](#) | [Intent to Plan](#) | [Attachment # 1-Letter of Support](#)

#### **Great Falls College Montana State University:**

- Request for authorization to rename a division of Academic Affairs-Division of General Studies  
[Item # 176-2901-R0917](#) | [Academic Proposal Request Form](#)

#### **Helena College University of Montana**

- Request for authorization of the Power plant and Airframe C.A.S. degrees in Aviation Maintenance Technology  
[Item # 176-1901-R0917](#) | [Academic Proposal Request Form](#) | [Curriculum Proposal Form](#) | [Intent to Plan](#)

September 13-14, 2017

ITEM 176-2010-R0917

**Request for authorization to offer a B.A. degree in Computer Science**

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**THAT**

Montana State University requests authorization from the Montana Board of Regents to offer a Bachelor of Arts degree in Computer Science.

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**EXPLANATION**

A Bachelor of Arts degree in Computer Science will provide students a broad set of valuable knowledge and skills and will graduate computer scientists with more diverse academic backgrounds. The program will be attractive to students who are interested in developing highly relevant problem-solving skills applicable in traditional Science, Technology, Engineering and Mathematics (STEM) careers in the context of an education that also provides depth and breadth in a non-STEM area.

The program will be attractive to employers seeking graduates with both problem-solving quantitative skills and with broad crossover, qualitative backgrounds in the arts, humanities and business. The program will address significant industry needs by educating students who will have strong computing skills and are comfortable collaborating across disciplines and working in team environments with experts from a wide range of backgrounds.

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**ATTACHMENTS**

Academic Proposal Request Form  
Curriculum Proposal Form  
Intent to Plan  
Attachment #1 - Letters of Support

**Montana Board of Regents**  
**ACADEMIC PROPOSAL REQUEST FORM**

ITEM 176-2010-R0917 Submission Month or Meeting: September 13-14, 2017

Institution: Montana State University CIP Code: 11.0701

Program/Center/Institute Title: Bachelor of Arts in Computer Science

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*

**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. 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**

Montana State University requests authorization from the Montana Board of Regents to offer a B.A. degree in Computer Science. The degree would enable a student to gain depth in both computer science and a second area that is not a traditional STEM area.

**Why**

There are several compelling reasons to offer this new degree. First, a B.A. degree in Computer Science provides a broader set of students with the knowledge and skills needed to enjoy meaningful, in-demand, impactful careers and lives. Second, there is a statewide, nationwide, and worldwide shortage of students with computing skills. Thus, a B.A. degree in Computer Science will benefit Montana's economy. Third, software is pervasive in today's world and as such it is important to graduate computer scientists with more diverse academic backgrounds who will have insights into new potential applications. Fourth, as discussed at the March 2016 Board of Regents Meeting in Dillon, the arts and humanities play a critical role in our world. By targeting students who have interests that are outside of traditional STEM areas, a B.A. degree in Computer Science can produce students with valuable crossover skills.

**Resources**

No new resources are needed to begin offering the B.A. degree in Computer Science. In fact, the proposal will be resource positive if our estimate is correct that the new degree will attract 5 students per year who would otherwise not have attended MSU.

**Relationship to similar MUS programs**

There is no other B.A. degree in Computer Science in the MUS system. The B.S. degree in Computer Science is offered by Montana State University, the University of Montana, and Montana Tech.

**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]*

Montana State University's Gianforte School of Computing proposes to offer a Bachelor of Arts degree in Computer Science. Said degree would enable a student to gain depth in both computer science and a second area that is not a traditional STEM area. The second area can be fulfilled by using an existing major or through a unit-defined plan (a unit such as Anthropology or Liberal Studies, can opt-in by either providing an articulated suite of courses or by designating an existing minor). The B.A. degree in Computer Science would not replace or modify any existing programs.

- 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]*

A B.A. degree in Computer Science strongly supports MSU's strategic learning goal of preparing students to graduate equipped for careers. In Montana, and nationwide, computer science degrees at all levels are among the most in-demand degrees. In 2016, according to <http://www.forbes.com/sites/susanadams/2015/11/25/top-degrees-for-getting-hired-in-2016/>, Computer Science is the second most demanded bachelor's degree, the most demanded master's degree and the second most demanded doctoral degree. In February 2017, the Montana High Tech Business Alliance reported that attracting and retaining skilled technology workers is their firms' largest impediment to faster growth.

The proposal also strongly supports MSU's strategic access goal of widening access to higher education and ensuring equality of opportunity for all. Except for white and Asian men, all populations are underrepresented in computing. For example, women earned only 17.9% of Computer Science degrees nationwide in Academic Year 2015-2016. Because the requirements to earn a B.A. degree in Computer Science differ significantly from the requirements to earn a B.S. degree in Computer Science, the B.A. degree in Computer Science will likely attract a different and more diverse student population. Studies show that teams with greater diversity are more effective at solving hard problems. Thus, a more diverse computing workforce can create a better future.

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

During academic year 2015-2016, a Computer Science task force, consisting of faculty and students, researched and designed the initial proposal that our advisory board then vetted. During the summer of 2016, a wide variety of constituents provided input. These constituents included the Honors College Dean, the Arts and Architecture Dean, the Letters and Science Dean, the Modern Languages Department Head, the Art Department Head, and many more. In September 2016, the proposal was submitted into MSU's CiM system where significant additional feedback was incorporated from MSU's Curriculum and Programs Committee and Faculty Senate.

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

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**CURRICULUM PROPOSAL FORM**

a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program	43
Credits in required courses offered by other departments	45-53
Credits in institutional general education curriculum ( <b>unsatisfied elsewhere</b> )	21
Credits of free electives	3-11
Total credits required to complete the program	120

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.

- An ability to connect computer science to an area that is traditionally non-STEM
- An ability to design, implement, and evaluate a computational solution to meet desired needs
- An ability to function effectively on teams to accomplish a common goal
- An ability to communicate effectively with a range of audiences
- Recognition of the need for, and an ability to engage in, continuing professional development
- An ability to use current techniques, skills, and tools necessary for computing practices

**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]*

There are several compelling reasons to offer this new degree. First, a B.A. degree in Computer Science provides a broader set of students with the knowledge and skills needed to enjoy meaningful, in-demand, impactful careers and lives. Second, there is a statewide, nationwide, and worldwide shortage of students with computing skills. Thus, a B.A. degree in Computer Science will benefit Montana’s economy. Third, software is pervasive in today’s world and as such it is important to graduate computer scientists with more diverse academic backgrounds who will have insights into new potential applications. Fourth, as discussed at the March 2016 Board of Regents Meeting in Dillon, the arts and humanities play a critical role in our world. By targeting students who have interests that are outside of traditional STEM areas, the B.A. degree in Computer Science can produce students with valuable crossover skills.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**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 Tech	B.S.	Computer Science
University of Montana	B.S	Computer Science
Montana State Univ.	B.S.	Computer Science

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]*

There is no other B.A. degree in Computer Science in the MUS system. The B.S. degree in Computer Science is offered by Montana State University, the University of Montana, and Montana Tech.

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]*

Not applicable. This is a new degree in the MUS system.

**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 program will commence upon approval. The proposal will be discussed at the September Board of Regents meeting and will then go to the Northwest Accreditation Commission. Thus, the program could potentially be offered to students as early as Spring Semester 2018.

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

Fall Headcount Enrollment					Graduates				
AY 19	AY 20	AY 21	AY 22	AY 23	AY 19	AY 20	AY 21	AY 22	AY 23
50	100	150	200	200	5	10	15	33	33

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**CURRICULUM PROPOSAL FORM**

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

The enrollment numbers come from **conservative** estimates based on the University of Colorado's experience with a Computer Science B.A. Within three years of its inception in 2013, there were 600 Computer Science B.A. majors. Note: CU has approximately twice the undergraduate population of MSU.

For the graduation estimates, assume that 50 new students start the program each year and that in the long-term, 65% (35 students) of those students graduate. Because this degree provides flexibility and marketability, the graduation rate is estimated to be higher than the current MSU graduation rate.

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

MSU is prepared to accommodate 50 or more 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 will be determined by meeting the fall enrollment headcounts and graduation numbers provided in section 7a. Because we can offer the new program by using existing curricular offerings, there is little downside. However, if interest is lower than our projections, we would more aggressively market the new degree to students. Based on experience at other universities as well as the pervasive nature of computing in today's world, a B.A. degree in Computer Science should receive significant student interest.

- 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]*

Our B.S. degree is ABET accredited. Since all of our courses are open to both B.S. and B.A. students, our ABET process will be used to evaluate learning outcomes. Our primary mechanisms to evaluate the attainment of learning outcomes take place when a student is a senior and are elaborated in 8b.

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

Student learning is assessed via a custom exam that students take in their final semester (a direct measurement), the portfolio that they assemble for their capstone course (a direct measurement), and a graduating senior survey (an indirect measurement).

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

We have an assessment committee that evaluates the results of the custom exam and the portfolio. These results, along with feedback from the graduating senior survey, are discussed at our annual faculty retreat and result in changes to our curriculum as appropriate.



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**CURRICULUM PROPOSAL FORM**

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

The B.S. degree in Computer Science is ABET accredited. ABET does not accredit the B.A. degree in Computer Science so the B.A. degree will be accredited through the Northwest Accreditation Commission. Since we plan to follow our ABET procedures, we anticipate being able to receive accreditation through NAC.

**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]*

Existing MSU classrooms, computer labs, and student spaces within the Gianforte School of Computing will be used to support the B.A. degree in Computer Science. If the B.A. degree in Computer Science program is popular, we anticipate that larger classrooms will be needed to offer some of our courses. The Registrar's Office helps MSU make efficient use of classroom space.

- 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 is no current need. As a side note, the physical space that comprises the College of Engineering will increase when Asbjornson Hall opens in 2019. It is anticipated that since the Gianforte School of Computing is part of the college, additional space will be allocated to the Gianforte School of Computing at that time.

**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]*

As of May 2017, the Gianforte School of Computing consists of 10 tenure-track faculty, 1 non-tenure track faculty, an administrative associate, an advisor, a financial manager, and a systems administrator. Due to recent student growth, we have been authorized to hire 2 additional tenure-track faculty members and 1 additional non-tenure track faculty member.

Because our courses serve both B.A. in Computer Science and B.S. students, and because we have recently received new personnel resources (see above paragraph), we are well positioned to initially offer the degree in a quality manner.

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- 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]*

Initially, we will require additional part-time instructors and full-time GTAs in order to meet the increased demand. In the long term, MSU has mechanisms that respond to growth based on increases in student credit hours (SCH) taught and majors served.

**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]*

The existing library 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]*

Students who undertake a B.A. degree in Computer Science can use existing student services that serve students in all majors.

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

A budget model was developed by the MSU budget office for estimating revenues and expenses below (available on request).

- 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	\$50,335	\$104,400	\$156,600
Expenditures	\$45,674	\$85,357	\$125,817
Net Revenue (revenues-expenditures)	\$4,661	\$19,043	\$30,783

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

**Revenue.** Assume that additional students will be attracted to MSU because of the B.A. degree in Computer Science. For FY 2019 assume 5, for FY 2020 assume 10, and for FY 2021 assume 15. For every 5 new students, assume 3 are in-state (60%) and 2 are out-of-state (40%). Use the amounts for full-time students on the following tuition/fee schedule:

[http://catalog.montana.edu/expenses/Fiscal\\_Year\\_18\\_Undergraduate\\_Fees.pdf](http://catalog.montana.edu/expenses/Fiscal_Year_18_Undergraduate_Fees.pdf)

**Expenditures.** Assume in FY 2019, 2 part-time instructors are hired to help with additional course offerings (\$10,000 per course, 18.91% benefits) and 2 full-time GTAs are hired to assist with

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additional CS labs (\$7,500 per GTA, 0.44% benefits), \$5,000 is needed for additional CS staff support (16.51% benefits) and \$1,000 is needed for materials. Double these figures for FY 2020 and triple these figures for FY 2021.

The revenue will cover the expenses.

- 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]*

Not applicable. The funding can come from the new revenues generated.

- 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.

Until the program enrollments stabilize, the funding can be provided through one-time allocations.

- 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]*

Not applicable.

- 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]*

Not applicable.

- 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.

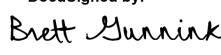



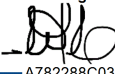
Not applicable.

- 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.

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**CURRICULUM PROPOSAL FORM**

Signature/Date

<b>College or School Dean:</b>	DocuSigned by:  0681914C9E95432...	8/2/2017
<b>Chief Academic Officer:</b>	DocuSigned by:  9EDD74A82C3A419...	8/1/2017
<b>Chief Executive Officer:</b>	DocuSigned by:  A782288C035847B...	8/1/2017
<b>Flagship Provost*:</b>	DocuSigned by:  9EDD74A82C3A419...	8/1/2017
<b>Flagship President*:</b>	DocuSigned by:  A782288C035847B...	8/1/2017

\*Not applicable to the Community Colleges.

**I. PROJECTED STUDENT ENROLLMENT**

	FY 2019		FY 2020		FY 2021	
	FTE	Headcount	FTE	Headcount	FTE	Headcount
<b>Projected enrollments</b>	50		100		150	

**II. REVENUE**

	FY 2019		FY 2020		FY 2021	
	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request						
2. Institution Funds						
3. Federal						
4. New Tuition Revenues from Increased Enrollments	\$50,335		\$104,400		\$156,600	
5. Student Fees						
6. Other (i.e., Gifts)						

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**Total Revenue**          \$0             \$50,335             \$0             \$104,400             \$0             \$156,600   

*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**

	FY <u>2019</u>		FY <u>2020</u>		FY <u>2021</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>A. Personnel Costs</b>						
1. FTE	_____	_____	_____	_____	_____	_____
2. Faculty	_____	_____	_____	_____	_____	_____
3. Adjunct Faculty	_____	\$20,000	_____	\$40,000	_____	\$60,000
4. Graduate/Undergrad Assistants	_____	\$15,000	_____	\$30,000	_____	\$45,000
5. Research Personnel	_____	_____	_____	_____	_____	_____
6. Directors/Administrators	_____	_____	_____	_____	_____	_____
7. Administrative Support Personnel	_____	\$5,000	_____	\$5,000	_____	\$5,000
8. Fringe Benefits	_____	\$4,674	_____	\$9,357	_____	\$14,817
9. Other: _____	_____	_____	_____	_____	_____	_____
<b>Total Personnel and Costs</b>	<u>    \$0    </u>	<u>   \$44,674   </u>	<u>    \$0    </u>	<u>   \$84,357   </u>	<u>    \$0    </u>	<u>   \$125,817   </u>

	FY <u>2019</u>		FY <u>2020</u>		FY <u>2021</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>B. Operating Expenditures</b>						
1. Travel	_____	_____	_____	_____	_____	_____
2. Professional Services	_____	_____	_____	_____	_____	_____
3. Other Services	_____	_____	_____	_____	_____	_____
4. Communications	_____	_____	_____	_____	_____	_____
5. Materials and Supplies	_____	\$1,000	_____	\$1,000	_____	\$1,000

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6. Rentals	_____	_____	_____	_____	_____	_____
7. Materials & Goods for Manufacture & Resale	_____	_____	_____	_____	_____	_____
8. Other:	_____	_____	_____	_____	_____	_____
<b>Total Operating Expenditures</b>	<u><b>\$0</b></u>	<u><b>\$1,000</b></u>	<u><b>\$0</b></u>	<u><b>\$1,000</b></u>	<u><b>\$0</b></u>	<u><b>\$1,000</b></u>

	<u>FY 2019</u>		<u>FY 2020</u>		<u>FY 2021</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>C. Capital Outlay</b>						
1. Library Resources	_____	_____	_____	_____	_____	_____
2. Equipment	_____	_____	_____	_____	_____	_____
<b>Total Capital Outlay</b>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>

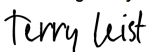
	<u>FY 2019</u>		<u>FY 2020</u>		<u>FY 2021</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>D. Capital Facilities Construction or Major Renovation</b>						
_____	_____	_____	_____	_____	_____	_____

	<u>FY 2019</u>		<u>FY 2020</u>		<u>FY 2021</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>E. Other Costs</b>						
1. Utilities	_____	_____	_____	_____	_____	_____
2. Maintenance & Repairs	_____	_____	_____	_____	_____	_____
3. Other:	_____	_____	_____	_____	_____	_____
<b>Total Other Costs</b>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>

<b>TOTAL EXPENDITURES:</b>	<u><b>\$0</b></u>	<u><b>\$45,674</b></u>	<u><b>\$0</b></u>	<u><b>\$85,357</b></u>	<u><b>\$0</b></u>	<u><b>\$125,817</b></u>
<b>Net Income (Deficit)</b>	<u><b>\$0</b></u>	<u><b>\$4,661</b></u>	<u><b>\$0</b></u>	<u><b>\$19,043</b></u>	<u><b>\$0</b></u>	<u><b>\$30,783</b></u>

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**CURRICULUM PROPOSAL FORM**

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:  
  
CC1B19F78B91405...

Campus Chief Financial Officer Signature

Chief Financial Officer comments:

This proposal has been reviewed and the fiscal assumptions are conservative.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**Appendix A – Proposed New Curriculum****Computer Science Bachelor of Arts****Freshman Year****Credits****Fall    Spring**

<a href="#">CSCI 107</a> – Joy and Beauty of Computing	3	
<a href="#">STAT 216Q</a> – Introduction to Statistics	3	
<a href="#">WRIT 101W</a> - College Writing I	3	
University Core	3	
Broadening Coursework	3	
CSCI 127 – Joy and Beauty of Data (new in AY18)		4
<a href="#">STAT 217Q</a> – Intermediate Statistical Concepts <sup>1</sup>		3
University Seminar Core		3
University Core		3
Broadening Coursework		3
Year Total:	15	16

<sup>1</sup> or M 165Q or M 171Q or M 181Q**Sophomore Year****Credits****Fall    Spring**

<a href="#">CSCI 132</a> – Basic Data Structures and Algorithms	4	
<a href="#">M 165Q</a> – Calculus for Technology I <sup>2</sup>	3	
University Core	3	
Broadening Coursework	6	
<a href="#">CSCI 232</a> - Data Structures and Algorithms		4
CSCI 246 – Discrete Structures		3
<a href="#">WRIT 221</a> - Intermediate Tech Writing		3
Broadening Coursework		6
Year Total:	16	16

<sup>2</sup> or M 166Q or M 172Q or M 182Q



**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

Junior Year	Credits	
	Fall	Spring
<a href="#">ESOF 322</a> - Software Engineering	3	
CS Elective	3	
University Core	3	
Broadening Coursework	6	
CS Electives		6
University Core		3
Broadening Coursework		6
Year Total:	15	15

Senior Year	Credits	
	Fall	Spring
CS Electives	6	
Broadening Coursework	5	
Free Elective	3	
ESOF 423–Software Eng. Applications (new in AY18)		3
<a href="#">CSCI 481</a> - Program Assessment		0
CS Elective		4
Broadening Coursework		6
Year Total:	14	13

120

Total Program Credits:

9 credits of the CS electives must be upper division credits.

The broadening coursework cannot come from traditional STEM areas (e.g. physical sciences, technology, engineering and math). The broadening coursework can be satisfied by undertaking any of the following plans:

- Plan 1: Complete a second major.
- Plan 2: Complete a unit-approved suite of disciplinary courses.
  - The suite of courses should be 27-33 credits.
  - A sample plan from the Department of Anthropology and Sociology (that is not yet approved by the department) appears below.
  - A unit can choose to use an existing 27-33 credit minor in place of defining a suite of courses.
  - If a unit chooses to participate in plan 2, there will be an advisor from the unit.
  - The first year of a modern language must also be completed (6-8 credits):

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

- e.g. ARAB, CHIN, FRCH, GRMN, JPNS or SPNS 101 and 102D
- Plan 3: Complete an advisor approved suite of multidisciplinary courses. This enables a student to construct a program that draws on multiple non-STEM fields.
  - The suite of courses should be 27-33 credits.
  - There will be an advisor(s) from the relevant field(s) or from a multidisciplinary unit such as Liberal Studies or the Honors College.
  - The first year of a modern language must also be completed (6-8 credits):
    - e.g. ARAB, CHIN, FRCH, GRMN, JPNS or SPNS 101 and 102D

## Sample Social and Cultural Anthropology Plan – 33 credits

Title: Social and Cultural Anthropology

Unit: Department of Anthropology and Sociology

Author: Larry Carucci

Required Courses (21 credits):

- ANTY101, **Anthropology and the Human Experience - 3 credits**
- ANTY215, **Human Prehistory - 3 credits**
- ANTY225, **Culture, Language, and Society - 3 credits**
- ANTY313, **Biological Anthropology - 3 credits**
- ANTY472, **Descriptive Linguistics** or ANTY473, **Language & Culture – 3 credits**
- ANTY350 **Old World Prehistory** or ANTY450 **Archaeological Theory – 3 credits**
- Capstone: ANTY425, **Social Organization** or ANTY428, **Anthropological Theory – 3 credits**

Elective Courses (12 credits):

- ANTY242, **Contemporary Japan – 3 credits**
- ANTY327, **Medical Anthropology- 3 credits**
- ANTY332, **Native North America – 3 credits**
- ANTY336, **Myth, Ritual and Religion- 3 credits**
- ANTY337, **Sex, Gender, Sexuality in Japan -3 credits**
- ANTY338, **Contemporary Pacific Societies – 3 credits**
- ANTY341, **Popular Culture – 3 credits**
- ANTY427, **Anthropology of Gender – 3 credits**
- ANTY441, **Social Movements in Japan – 3 credits**
- ANTY494, **Food and Culture** (number may be regularized in the future) – **3 credits**
- Note: ANTY 425, 428, 472, 473 may also count here, but may NOT double count

# Montana University System

## NOTICE OF INTENT TO PLAN

Program/Institute Title: Computer Science B.A. Degree  
 Campus, School/Department: MSU-Bz, Gianforte School of Computing  
 Contact Name/Info: John Paxton, john.paxton@montana.edu  
 Expected Submission Date: MAR 2017  
 Mode of Delivery: Face-to-Face

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.

For more information regarding the Intent to Plan process, please visit the Academic and Student Affairs Handbook.

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

The Computer Science Department proposes to offer a B.A. in Computer Science starting in Fall Semester 2017. The B.A. in Computer Science would serve students who also have a strong interest in academic areas such as the arts, the humanities and/or the social sciences. The University of Colorado introduced the B.A. in Computer Science in 2013 and as of 2015, 600 students were pursuing the new major. If a similar phenomenon occurred at Montana State University, there would be 300 students pursuing the new major within three years. In the 2016 State of the Union address, President Obama stated that "In the new economy, computer science isn't an optional skill - it's a basic skill, right along with the three Rs." Offering a B.A. in Computer Science would provide Montana State University students with the opportunity to learn highly relevant problem solving skills in the context of an education that is richer in the liberal arts.

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

According to the Computing Research Association, 49% of the annual projected growth in STEM job openings from 2012-2022 will occur in computing  
 (<http://cra.org/govaffairs/wp-content/uploads/sites/6/2014/10/All-STEM-Jobs-Graph-Feb-2014.pdf>)

and 65% of the annual projected growth in new STEM jobs from 2012-2022 will occur in computing (<http://cra.org/govaffairs/wp-content/uploads/sites/6/2014/10/Newly-Created-STEM-Jobs-Graph-Feb-2014.pdf>). A February 2016 study by The University of Montana's Bureau of Business and Economic Research shows that MHTBA members have the capacity to add 940 net new jobs in 2016 (<http://www.bber.umt.edu/pubs/econ/highTechBusAlliance2016.pdf>). Yet last year, only 64 students graduated with computer science degrees from Montana State University, the state's largest producer of CS graduates. A Computer Science B.A. would enable more students to graduate with in-demand skills.

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

The new degree helps support the following parts of Montana State University's strategic plan:

- (1) Learning. More students will have the opportunity to earn a degree that prepares them for in-demand careers and graduate study.
- (2) Discovery. Increasingly, research projects have a need for computational expertise. The B.A. degree will result in more undergraduates being able to contribute to research projects.
- (3) Engagement. Because software is pervasive in today's society, more students will be better prepared to engage with and contribute to our local community and state.
- (4) Access. The B.A. degree will provide students who do not identify as scientists or engineers with opportunities to gain computational thinking skills and pursue in-demand, flexible, well-paid, meaningful careers.
- (5) Stewardship. The B.A. degree can be largely created by leveraging courses that already exist.

**4) How does the proposed program/center/institute fit within the MUS system?**

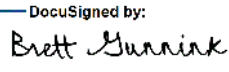
There is currently no Computer Science B.A. program in the MUS system. The largest three producers of Computer Science B.S. degrees in the MUS from largest to smallest are Montana State University, the University of Montana and Montana Tech.

## Signatures

### Intent to Plan

Program/Institute/Center Title: Computer Science B.A. Degree  
Campus: MSU-Bz, Gianforte School of Computing  
Expected Submission Date: MAR 2017


#### Signature/Date

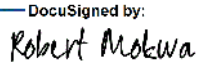
College/School Dean:  7/27/2016  
DocuSigned by:  
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
Graduate Dean: \_\_\_\_\_  
(Graduate academic programs only)

Vice President Research: \_\_\_\_\_  
(Research centers/institutes only)

Chief Academic Officer:  8/1/2016  
DocuSigned by:  
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Chief Executive Officer:  8/1/2016  
DocuSigned by:  
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Flagship Provost:  8/1/2016  
DocuSigned by:  
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Flagship President:  8/1/2016  
DocuSigned by:  
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Date of Final Review: November 18, 2016

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

Edward Allen  
Senior Director, Service Cloud Development  
Oracle  
136 Enterprise Blvd.  
Bozeman, MT 59718

August 10, 2016

John Paxton  
Director  
Gianforte School of Computing  
Montana State University  
Bozeman, MT 59717

Dear John,

This letter is written in support of the proposed Bachelor of Arts in Computer Science degree within the Gianforte School of Computing. In the realm of the high-tech workforce, there are a number of positions and a demand for people who are able to speak the language of computing but that don't require the curriculum of a typical Computer Science degree.

I personally hire many of these people into full-time, well-paid positions within software testing. In addition, Oracle hires many people into product ownership and project management positions. These positions are filled with people who can code, but beyond that are trained to think creatively at a systemic level, can manage disparate projects and people and who can solve problems. These skills are in demand within a high-tech workforce and the skills that would be developed in a Bachelors of Arts in Computer Science degree.

I absolutely support the proposed Bachelor of Arts in Computer Science degree and encourage that support from anyone reading this letter.

Sincerely,



Edward Allen  
Senior Director, Service Cloud Development  
Oracle  
edward.allen@oracle.com

Montana High Tech Business Alliance  
1121 E Broadway St, Suite 108  
Missoula, MT 59802  
406.552.9157  
director@mthightech.org  
www.MTHighTech.org



AUGUST 29, 2016

To Whom It May Concern:

The Montana High Tech Business Alliance is delighted to support the proposal put forth by Montana State University's Gianforte School of Computing to create a new Computer Science B.A. degree for Fall Semester 2017.

The Alliance was formed in 2014 and includes nearly 300 member companies. Montana's high tech industry is growing at seven times the rate of the overall Montana economy and paying twice the median wage. The number one barrier to growth for our members is finding enough high-tech talent, especially Computer Science graduates. At any given time we have about 100 Montana jobs listed in our jobs portal and roughly half of those are programming positions.

The Montana High Tech Business Alliance believes adding a B.A. degree at MSU that expands the computer scientist's broader relevant skill set - writing, speaking, entrepreneurial understanding, design thinking, working with diverse teams, etc. – will make the Computer Science major attractive to a wider range of candidates. The Computer Science B.A. will help to expand the talent pool for Montana high-tech companies – a diverse sector that demands an adaptable workforce with varied skills.

If MSU could produce 300 new computer science majors within 3 years by adding a Computer Science B.A., this would be of tremendous benefit to Montana's high-tech companies who are currently forced to hire programmers out of state or slow their growth due to lack of available talent.

Thank you for your consideration of this important proposal.

Sincerely,

  
Christina Henderson

EXECUTIVE DIRECTOR

Haley Cox  
605 W Olive St  
Bozeman, MT 59715  
[haleymcox@gmail.com](mailto:haleymcox@gmail.com)  
(970) 397 0659

To Whom it May Concern:

My name is Haley Cox and I am going into my Junior year studying Computer Science, Economics and Microbiology at MSU. I am writing this letter in support of the Bachelor of Arts of Computer Science degree.

As always with growth, it has recently become increasingly important for the Computer Science Department (and now Gianforte School of Computing) to welcome a diverse array of folks to the field. Already making such progress in welcoming women, people of color and LGBTQ students to the table, Computer Science is now ready to expand their diverse field of students to include interdisciplinary students in non-science fields.

The Computer Science B.A. would allow me to finish my degree in computer science alongside my Economics and Microbiology degrees. This combination of study will allow me to enter my future medical career prepared to tackle the multitude of challenges thrown my way. My current job is as a medical scribe, for an orthopedic surgeon who studied computer science in his undergraduate education. My job -- to document my doctor's appointments in his electronic database -- is already interdisciplinary, and I'm working at the very bottom of the field.

This degree would not only be interdisciplinary, but would occur at a crucial intersection between the arts and the sciences. Innovative Higher Education put it this way: "With repeated exposure to interdisciplinary thought, learners develop more advanced epistemological beliefs, enhanced critical thinking ability and metacognitive skills, and an understanding of the relations among perspectives derived from different disciplines." I would greatly value the opportunity to grow my education through this degree program. The combination of studies, between the language requirements, core classes at MSU, the required minor, and fundamental computer science classes is an opportunity for future computer scientists to see the scope of their field from another perspective.

Thank you so much for your time and consideration of this program!

Best,  
Haley Cox







**To:** John Paxton / MSU Curriculum Committee  
**From:** Galen Brokaw, MLL Department Head  
**Date:** August 10, 2016  
**Re:** B.A. in Computer Science

I am writing in support of the proposal for a B.A. in Computer Science, which requires two semesters of language. The Department of Modern Languages is aware and supportive of the language requirement, and we will dedicate the resources required to accommodate any increased enrollments resulting from this new program.

**Department of  
Modern Languages  
& Literatures**

117 Gaines Hall  
P.O. Box 172980  
Bozeman, MT 59717-2980  
[www.montana.edu/ml](http://www.montana.edu/ml)

Tel 406-994-4448  
Fax 406-994-6199  
[modernlanguages@montana.edu](mailto:modernlanguages@montana.edu)

September 13-14, 2017

**ITEM 176-2011-R0917**

**Request for authorization to re-establish a PhD in Electrical Engineering**

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**THAT**

Montana State University requests authorization from the Montana Board of Regents to re-establish a separately named PhD program in Electrical Engineering.

---

**EXPLANATION**

MSU previously offered a PhD in Electrical Engineering (EE) from 1962-1996. The proposed re-establishment of the standalone EE PhD enables Montana State University to improve recruiting of top students from across the country and around the world by offering a degree with a widely recognized title, the PhD in Electrical Engineering, rather than the PhD in Engineering with an “option” in electrical engineering. The current title creates the perception of a lesser, inferior degree for those seeking a more traditionally recognizable terminal degree in electrical engineering. Furthermore, this change recognizes the sustainable growth of the doctoral program in electrical engineering at MSU.

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**ATTACHMENTS**

Academic Program Request Form  
Curriculum Proposal Form  
Intent to Plan  
Attachment #1 – Letter of Support

**Montana Board of Regents**  
**ACADEMIC PROPOSAL REQUEST FORM**

ITEM 176-2011-R0917 Submission Month or Meeting: September 13-14, 2017

Institution: Montana State University CIP Code: 14.10

Program/Center/Institute Title: PhD in Electrical Engineering

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*

**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. 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**

Montana State University requests authorization from the Montana Board of Regents to re-establish a PhD program in Electrical Engineering.

**Why**

MSU previously offered a PhD in Electrical Engineering (EE) from 1962-1996. The proposed re-establishment of the standalone EE PhD enables Montana State University to improve the recruiting of top students from across the country and around the world by offering a degree with a widely recognized title, the PhD in Electrical Engineering, rather than the PhD in Engineering with an “option” in Electrical Engineering. The current title creates the perception of a lesser, inferior degree for those seeking a more traditionally recognizable terminal degree in electrical engineering. Furthermore, this change recognizes the sustainable growth of the doctoral program in Electrical Engineering at MSU.

**Resources**

This proposal requests that the resources currently assigned to provide the Electrical & Computer Engineering option of the consolidated PhD in Engineering be re-assigned to provide the standalone PhD in Electrical Engineering. There would be no changes in reporting lines, program mission, faculty assignments, or duplication of administrative activities.

**Relationship to similar MUS programs**

Other than the existing MSU PhD in Engineering, no other MUS program provides the doctoral degree in this field. The MSU Electrical & Computer Engineering faculty, and the Montana Tech Electrical Engineering faculty, have agreed to continue coordinating faculty research and graduate cooperation between the two existing electrical engineering departments in the MUS system, as well as encourage qualified Montana Tech faculty to participate in the re-established EE doctoral program administered by the MSU ECE Department.

**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]*

Montana State University requests permission to offer a separately named PhD program in Electrical Engineering. This change recognizes the sustainable growth of the doctoral program in electrical engineering and assigns to the program's doctoral graduates the academic title and credential most appropriate for professional practice in this field. There would be no direct costs necessary to make this change in nomenclature. There would be no changes in reporting lines, program mission, faculty assignments, or duplication of administrative activities. This proposal requests re-establishment of the standalone PhD in Electrical Engineering that had previously existed from 1962-1996.

- 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 doctoral graduate program in Electrical Engineering, provided by the faculty of the MSU Department of Electrical & Computer Engineering: (a) educates students in advanced electrical engineering topics, (b) enables student acquisition of knowledge and hands-on experience in engineering research, and (c) supports students' scholarly development of skills in academic learning, discovery, and professional service. Doctoral graduates of the program go on to careers in industrial R&D, governmental research institutes, start-up companies as innovative entrepreneurs, and academic teaching and research positions. The re-establishment of the PhD in Electrical Engineering will not alter the mission or focus of the doctoral program.

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 Electrical Engineering will allow increased recruitment of prospective doctoral students who are best served by a "PhD in Electrical Engineering," which is the academic title and credential most appropriate for professional practice in this field, not the currently awarded "PhD in Engineering" with options.

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

For historical context, up until the 1996 catalog, MSU offered a standalone PhD in Electrical Engineering, as well as several other engineering disciplines. In 1996, following system-wide program review due to budget curtailment, the MSU College of Engineering consolidated its doctoral programs into a single PhD in Engineering that had four options, including Electrical & Computer Engineering. MSU established a standalone PhD in Computer Science in 2002. Thus, this proposal requests re-establishment of the standalone PhD in Electrical Engineering. Now with the sustained growth in our doctoral program, and the support of the MSU administration, this proposal has been prepared.

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

**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	48
Credits in required courses offered by other departments	12
Credits in institutional general education curriculum	0
Credits of free electives	0
Total credits required to complete the program	60

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.

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

- Effectively apply theories, experimental methods, and scientific knowledge to address fundamental research questions in electrical engineering and related fields.
- Demonstrate a broad mastery of electrical engineering knowledge sufficient to enable effective university teaching, advising, mentoring, curriculum development, and assessment of student learning.
- Devise and pursue research of significance to the field of electrical engineering and related interdisciplinary fields, demonstrating intellectual independence and scholarly leadership.
- Demonstrate superior skills in oral and written communication sufficient for successful peer-reviewed scholarly publications, presentations, and grant proposals.
- Follow, and knowledgeably discuss, the principles of ethics in research and scholarly activity.
- Enable and encourage participation in the field of electrical 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 doctoral graduate program in Electrical Engineering provided by the faculty of the MSU Department of Electrical & Computer Engineering educates graduate students to be key contributors to advanced and innovative engineering research and development. Program graduates are equipped to be leaders in the high-tech economy upon which our state, and our country, depend. Individuals who earn a PhD in Electrical Engineering are particularly suited for careers as entrepreneurs in start-up companies, which currently form the basis of the growing technical economy in the Bozeman area, and throughout the state. Students who complete graduate degrees in Montana are often inclined to stay in the state, thereby boosting our technical capabilities and know-how.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

The proposed re-establishment of the standalone EE PhD also enables Montana State University to improve their recruiting of top students from across the country and around the world by offering a degree with a widely recognized title, the PhD in Electrical Engineering, rather than the PhD in Engineering with an “option” in electrical engineering. The current title creates the perception of a lesser, inferior degree for those seeking a true electrical engineering credential.

**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]*

A mutual agreement between the MSU ECE faculty and the Montana Tech EE faculty has been in place since 2008, allowing qualified electrical engineering professors from Montana Tech to mentor graduate students who they recruit, mentor, and supervise. The Department Heads of the respective programs met with the academic leadership of MSU and Tech on January 12, 2017, to explore areas of mutual interest. Faculty representatives from both schools met on March 31, 2017, specifically to continue discussion about coordination. The Department Heads have agreed to reaffirm and strengthen the ability of qualified electrical engineering professors at Montana Tech to participate in the re-established EE doctoral program administered by the MSU ECE Department, and to coordinate faculty research and graduate cooperation between the two existing electrical engineering departments in the MUS system.

**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 electrical 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.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

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

Fall Headcount Enrollment					Graduates				
AY18	AY19	AY20	AY21	AY22	AY18	AY19	AY20	AY21	AY22
14	14	16	16	18	2	2	3	2	3

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

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

**AY12:** 12 (1); **AY13:** 12 (3); **AY14:** 13 (2); **AY15:** 15 (3); **AY16:** 14 (1)

It is our experience that students require approximately 5 years to earn the PhD, and so our current 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 ECE Department place increased emphasis on doctoral education, we anticipate 16-18 students enrolled by AY22, and an average of 2-3 graduates per year.

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

The MSU ECE Department currently has 15 tenure-track faculty, and all are assigned a research role as part of their academic assignment and evaluation. We expect that each tenure-track faculty member will have at least one doctoral student, supporting a minimum capacity of 15 students. Many of our faculty support more than one doctoral student, so a target capacity of 16-18 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]*

We define success with three attributes: effective student recruiting, successful student progress, and a sustainable rate of graduation. Student recruiting refers to our ability to attract high-quality applicants and to gain their acceptance of our graduate assistantships. Successful student progress refers to the enrolled students passing our Qualifying Exam on schedule, scheduling and successfully passing the Comprehensive Exam/Dissertation Proposal within 2 years, preparing a high-quality dissertation, and defending the independent research within 4-5 years. Finally, we consider at least 2 student graduating per year a sustainable rate, given the allocation of supervisory committee duties and student supervision for our 15-person faculty.

If we find that we are not achieving these attributes, our faculty will determine the means to improve performance in any area(s) that are found to be lagging, as these attributes 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]*



**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

The EE PhD program comprises a set of student accomplishments and assessments. First, the admitted students must pass our departmental Qualifying Exam, which is a 4-hour written exam covering the essential knowledge of an undergraduate BSEE program. The exam ensures that the student has the capability of succeeding in graduate-level coursework. Next, the student enrolls in 30-40 credits of graduate coursework covering advanced topics in the field. Specific course requirements include professional communication, proposal preparation, and numerical methods. After approximately two years the student must form a Supervisory Committee and work with a faculty research advisor to prepare a dissertation topic proposal. This is presented as part of the Comprehensive Exam for the doctoral program. The student takes additional coursework while performing the dissertation research. Finally, the student's overall accomplishments and the dissertation are evaluated in the final Oral Exam and 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 Supervisory Committee (indirect measures). For example, EE doctoral students 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 ECE Department's Graduate/Research Committee (ECE GRC) is a standing committee with a mix of senior and junior ECE faculty who handle ECE graduate student recruiting, application review, assistantship recommendations, preparation and grading of the Qualifying Exam, and many other duties associated with the ECE graduate program. Reporting to the Department Head, the GRC is charged with monitoring the health and accomplishments of our graduate 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 electrical engineering (BSEE) and computer engineering (BSCpE) 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 EE PhD program will utilize the existing research and teaching space, equipment, and facilities currently used by the ECE Department to deliver the ECE option of MSU's existing 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]*

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

There are no incremental needs or costs associated with re-establishing the EE PhD 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]*

The MSU ECE Department has 15 tenure-track faculty, 3 part-time instructional faculty, 1 research professor, 5 support staff (administrative assistants, accounting support, electronics stockroom/maintenance support, and computer support), and other support personnel. The faculty and staff currently deliver the undergraduate EE and CpE programs, and the EE and Optics master's and Engineering PhD programs.

- Academic Programs (Fall 2016)
  - Electrical Engineering: 259
  - Computer Engineering: 144
  - MS-Electrical Engineering: 13
  - MS-Optics: 2
  - Master of Engineering: 3
  - PhD in Engineering (EE): 14
- Sponsored Programs
  - 2015 proposals submitted: 54
  - New grants started '15-'16: 56
  - Current grants-in-force: \$8,697,249
  - FY15 sponsored expenditures: \$1,707,350
    - (FY14: \$1,548,407)
    - (FY13: \$1,644,000)

- 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]*

There are no incremental needs or costs associated with re-establishing the EE 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 EE 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 existing student services and support for graduate students will continue with the EE PhD, as has been accomplished for students in the EE option of the PhD in Engineering.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**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 EE PhD program pay regular graduate tuition, which generally comes from their appointment as graduate research assistants funded by external grants and contracts. The cost associated with instruction and support is not materially affected by separating the EE PhD from the existing PhD in Engineering. A simple budget model was developed by MSU budget office for estimating revenues below (available on request).

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	14 existing students \$64,093	14 existing students \$66,251	14 students + 2 new \$75,715
Expenditures	(\$64,093)	(\$66,251)	(\$66,251)
Net Revenue (revenues-expenditures)	\$0	\$0	\$9,464

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 EE 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 ECE Department for the PhD in Engineering, ECE option, will be continued under the auspices of the EE 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

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

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.

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 EE PhD.

**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.

Signature/Date

**College or School Dean:** DocuSigned by:  
*Brett Gunnink*  
0681914C9E95432... 8/2/2017

**Chief Academic Officer:** DocuSigned by:  
*Robert Mokwa*  
9EDD74A82C3A419... 8/2/2017

**Chief Executive Officer:** DocuSigned by:  
*Waded Cruzado*  
A782288C035847B... 8/2/2017

**Flagship Provost\*:** DocuSigned by:  
*Robert Mokwa*  
9EDD74A82C3A419... 8/2/2017

**Flagship President\*:** DocuSigned by:  
*Waded Cruzado*  
A782288C035847B... 8/2/2017

\*Not applicable to the Community Colleges.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**I. PROJECTED STUDENT ENROLLMENT**

	FY <u>2018</u>		FY <u>2019</u>		FY <u>2020</u>	
	FTE	Headcount	FTE	Headcount	FTE	Headcount
<b>A. Projected enrollments</b>	<u>14</u>	<u>14</u>	<u>14</u>	<u>14</u>	<u>16</u>	<u>16</u>

**II. REVENUE**

	FY <u>2018</u>		FY <u>2019</u>		FY <u>2020</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>0</u>	<u>\$0</u>	<u>0</u>	<u>\$0</u>	<u>0</u>	<u>\$9,464</u>
5. Student Fees	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</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>
<b>Total Revenue</b>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$9,464</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**

	FY <u>2018</u>		FY <u>2019</u>		FY <u>2020</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>A. Personnel Costs</b>						
1. FTE	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
2. Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
3. Adjunct Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
4. Graduate/Undergrad Assistants	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>		

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

5. Research Personnel	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
6. Directors/Administrators	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
7. Administrative Support Personnel	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
8. Fringe Benefits	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
9. Other:	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total Personnel and Costs</b>	<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>B. Operating Expenditures</b>						
1. Travel	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
2. Professional Services	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
3. Other Services	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
4. Communications	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
5. Materials and Supplies	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
6. Rentals	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
7. Materials & Goods for Manufacture & Resale	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
8. Miscellaneous	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total Operating Expenditures</b>	<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 <u>2018</u>		FY <u>2019</u>		FY <u>2020</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>C. Capital Outlay</b>						
1. Library Resources	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
2. Equipment	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total Capital Outlay</b>	<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**

	FY	<u>2018</u>	FY	<u>2019</u>	FY	<u>2020</u>
<b>D. Capital Facilities Construction or Major Renovation</b>	0	0	0	0	0	0
<b>E. Other Costs</b>						
Utilities	0	0	0	0	0	0
Maintenance & Repairs	0	0	0	0	0	0
Other	0	0	0	0	0	0
<b>Total Other Costs</b>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
<b>TOTAL EXPENDITURES:</b>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
<b>Net Income (Deficit)</b>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$9,464</u>

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:  
Terry Leist  
Campus Chief Financial Officer Signature

Chief Financial Officer comments:

Since this is a re-naming of an existing program, we do not anticipate a financial impact, at least initially. Any future resource requests for this program will require Dean and Provost approval. If additional university funds are required, the Provost will seek approval from the President, with involvement by the CFO.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**Appendix A – Proposed New Curriculum**

An EE Ph.D. Program of Study must include the following:

Total  $\geq$  60 credits

All PhD credits no more than ten (10) years old at time of graduation (this limit does not apply to courses counted from a previously earned master's degree).

- 3 credits Research & Methods in Engineering (ENGR 610) in 1st semester.
- 2 credits Seminar (ENGR 694), taken just before Comprehensive Examination.
- 3 credits Advanced Math (committee-approved course focusing on mathematical or numerical methods, typically satisfied by either 4xx and higher math courses or math-methods graduate engineering courses).
- 3 credits Numerical Methods (committee-approved).
- 18 credits Dissertation (EELE 690).
- $\geq$  24 course credits:
  - $\leq$  9 credits at 4xx level (beyond master's degree courses).
  - up to 24 graded course credits with grade of B or better from a previously earned master's degree can be approved by the student's committee (these classes do not have to be listed explicitly on the program of study form).
- 7 additional credits of graded coursework or dissertation (EELE 690).

All credits must also meet the following conditions:

- $\leq$  6 credits Independent Study (EELE 592).
- $\leq$  3 credits pass/fail, excluding dissertation.
- $\leq$  9 credits challenged.
- No credits of 488, 489, 490, 492, 494, 498, 575, or 589 are allowed.
- Regardless of how many course credits are applied from a previously earned master's degree, the PhD program of study must include at least 13 credits of major courses taken at Montana State University.



## Montana University System

### NOTICE OF INTENT TO PLAN

Program/Institute Title: PhD in Electrical Engineering  
Campus, School/Department: MSU-Bz, Electrical & Computer Engineering  
Contact Name/Info: Robert C. Maher, rob.maher@montana.edu  
Expected Submission Date: MAR 2017

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.

For more information regarding the Intent to Plan process, please visit the Academic and Student Affairs Handbook.

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

The proposal requests permission to offer a separately-named PhD program in Electrical Engineering. This change is to reflect the sustainable growth of the doctoral program in electrical 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 direct cost attributable to this change. There would be no changes in reporting lines, program mission, faculty assignments, or duplication of administrative activities. For historical context, up until the 1996 catalog MSU offered a standalone PhD in Electrical Engineering, as well as several other engineering disciplines. In 1996 following system-wide program review the MSU College of Engineering consolidated its doctoral programs into a single PhD in Engineering that had four options: Applied Mechanics, Chemical & Materials Engineering, Electrical & Computer Engineering, and Environmental Engineering. A standalone PhD in Computer Science was established in 2002. Thus, this proposal requests re-establishment of the standalone PhD in Electrical Engineering.

#### **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 doctoral graduate program in Electrical Engineering provided by the faculty of the MSU Department of Electrical & Computer Engineering: (a) educates students in advanced electrical engineering topics, (b) enables student acquisition of know-how and hands-on experience in engineering research, and (c) supports their scholarly development of skills in academic learning,

discovery, and professional service. Doctoral graduates of the program go on to careers in industrial R&D, in governmental research institutes, in start-up companies as innovative entrepreneurs, and in academic teaching and research positions. The re-establishment of the PhD in Electrical Engineering will not alter the mission and focus of the doctoral program.

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

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 Electrical Engineering will allow increased recruitment of prospective doctoral students who are best served by a "PhD in Electrical Engineering," which is the academic title and credential most appropriate for professional practice in this field, not the currently awarded "PhD in Engineering" with options.

**4) Describe how the proposed program/center/institute overlaps, complements, or duplicates existing entities or offerings within the MUS system?**

The re-established PhD in Electrical Engineering will not duplicate any other program in the MUS system. The PhD in EE is highly compatible with other doctoral programs at MSU, including Computer Science, Physics, Chemistry, and Cell Biology and Neuroscience. The re-established PhD program will also continue to admit and mentor graduate students who are recruited, supported, and supervised by qualified electrical engineering professors at Montana Tech, under a mutual agreement between the MSU ECE faculty and the Tech EE faculty that has been in place since 2008. The MSU ECE Department has reached out to the Department of Electrical Engineering at Montana Tech, and the Department Heads of the respective programs met with the academic leadership of MSU and Tech on January 12, 2017, to explore areas of mutual interest. The Department Heads have agreed to strengthen the ability of qualified electrical engineering professors at Montana Tech to participate in the re-established EE doctoral program administered by the MSU ECE Department, and to continue discussion of future steps to coordinate faculty research and graduate cooperation between our two existing electrical engineering departments in the MUS system. An action item from the January 12, 2017 meeting included plans to conduct a follow-up meeting that includes the pertinent Electrical Engineering faculty from MSU and MT Tech, subsequent to receiving approval of the Intent to Plan for this program. The purpose of the meeting is to further explore and define specific components of a collaborative arrangement between the two campuses that will strengthen this proposed program by leveraging faculty and infrastructure resources that already exist in the two programs. The Level II proposal will describe details of the collaborative program that is developed thru this process, and any associated resource or funding requirements.

# Signatures

## Intent to Plan

Program/Institute/Center Title: PhD in Electrical Engineering  
Campus: MSU-Bz, Electrical & Computer Engineering  
Expected Submission Date: JAN 2017/MAR 2017

### Signature/Date

College/School Dean: DocuSigned by: *Brett Sumner* 2/2/2017  
0681914C9E95432...

Graduate Dean: DocuSigned by: *Karlene A. Hoo* 2/2/2017  
(Graduate academic programs only) 1F6B90CC1B5B461...

Vice President Research: \_\_\_\_\_  
(Research centers/institutes only)

Chief Academic Officer: DocuSigned by: *Robert Mokuwa* 2/2/2017  
9EDD74A82C3A419...

Chief Executive Officer: DocuSigned by: *Waded Cruzado* 2/2/2017  
A782288C035847B...

Flagship Provost: DocuSigned by: *Robert Mokuwa* 2/2/2017  
9EDD74A82C3A419...

Flagship President: DocuSigned by: *Waded Cruzado* 2/2/2017  
A782288C035847B...

Date of Final Review: \_\_\_\_\_ March 2017 \_\_\_\_\_

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



June 22, 2017

Dr. Rob Maher  
Electrical & Computer Engineering Department  
Montana State University  
Bozeman, MT 59717-3780

Dear Rob:

I'd like to express Montana Tech's support for MSU's proposal to re-establish the Doctor of Philosophy in Electrical Engineering (PhD-EE) program. This program is critical to supporting world-class research programs at MSU- Bozeman and Montana Tech. I look forward to further expanding our collaborations under this new program. As you know, Tech's eventual goal is to have a collaborative PhD-EE within the MUS. It is our hope that when the time comes for Montana Tech to submit our PhD-EE proposal, MSU-Bozeman will in turn support our request.

For nearly a decade our departments have collaborated in PhD-level research. This has included Tech faculty serving on MSU-Bozeman PhD student committees, and having Tech faculty advise PhD students. Access to a quality PhD program is critical to the sustainability of our research at Tech. Re-establishing the PhD-EE program at MSU-Bozeman and allowing Tech to be affiliated with this program is a first step towards the desired sustainable level.

Please let me know if there is anything further I can do to help support this proposal. My hope is that we can further strengthen our collaborations thru this new program.

Sincerely,

Dan Trudnowski, PhD, PE  
Department Head

Cc: Doug Abbott, Provost, Montana Tech  
Don Blackketter, Chancellor, Montana Tech

September 13-14, 2017

**ITEM 176-2910-R0917**

**Request for authorization to rename a division of Academic Affairs-Division of General Studies**

---

**THAT**

Great Falls College MSU requests authorization from the Montana Board of Regents for a minor change in the renaming of a division of Academic Affairs.

---

**EXPLANATION**

The division of General Education, Business, Technology & Transfer will be renamed the Division of General Studies. This change better reflects and simplifies the mission and aspirations of the programs in those areas.

---

**ATTACHMENTS**

Academic Proposal Request Form

**Montana Board of Regents**  
**ACADEMIC PROPOSAL REQUEST FORM**

ITEM 176-2910-R0917 Submission Month or Meeting: September 13-14, 2017

Institution: Great Falls College MSU CIP Code: \_\_\_\_\_

Program/Center/Institute Title: Rename a division of Academic Affairs

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*

**Montana Board of Regents**  
**ACADEMIC PROPOSAL REQUEST FORM**

X **B. Level II:**

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)
- X   4. **Re-titling an academic, administrative, or research unit**

**Proposal Summary** [360 words maximum]

**What**

Great Falls College MSU requests authorization from the Montana Board of Regents of a minor change in the renaming of a division of Academic Affairs.

**Why**

The division of General Education, Business, Technology & Transfer will be renamed the Division of General Studies. This change better reflects and simplifies the mission and aspirations of the programs in those areas.

**Resources**

**Relationship to similar MUS programs**

September 13-14, 2017

**ITEM 176-1901-R0917**

**Request for permanent authorization of the Powerplant and Airframe C.A.S. degrees in Aviation Maintenance Technology; Helena College**

---

**THAT**

Helena College University of Montana requests authorization from the Montana Board of Regents of Higher Education to make permanent the temporary Powerplant and Airframe C.A.S. degrees in Aviation Maintenance Technology.

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**EXPLANATION**

Helena College University of Montana began operations in 1939 when it first offered an aviation training program in conjunction with the military. This program has sustained over 75 years of growth and change and it is currently the only educational program in the State of Montana that prepares students to become licensed Airframe and Powerplant mechanics. This program's requirements and hours are strictly maintained by the Federal Aviation Administration (FAA) in accordance with rigorous FAA standards. The program at Helena College must provide high quality instruction and meet the demanding performance standards of the FAA in order to continue to operate. The current Aviation program was due for a thorough review and curriculum alignment to ensure that credit hours match the required classroom hours according to the FAA. Each course was reviewed and credit hours aligned with FAA requirements. These updates were approved by the Helena College Academic and Curriculum Standards Committee of Helena College and the Chief Academic Officer who recommended the changes for submission to the MUS Board of Regents.

Current students are able to obtain an A.A.S. degree upon completion of this program. Due to this review, the existing Aviation program is being adjusted to ensure alignment of Helena College credit hours with FAA-required classroom, laboratory, and lecture contact hours. This adjustment results in an increase from 80 to 96.25 credit hours. The A.A.S. in Aviation Maintenance will now be offered over five semesters (four regular semesters and one summer semester), making this a five-semester program still able to be completed in a two-year period. Therefore, Helena College is hereby submitting a Level I request for authorization to revise the A.A.S. in Aviation Maintenance Technology to address the increase in credit hours required by the FAA.

To better serve students and the aviation industry, Helena College submitted an Intent to Plan for these two C.A.S. degrees, a Level I to revise the A.A.S (173-1901-LI1116), and another Level I to establish the two C.A.S. degrees (173-1901-LI1116) in November 2016. The two C.A.S. credentials have a shared core curriculum. The revised A.A.S. degree will remain as an option to the students, but the combination of these two stackable C.A.S. credentials with a minimal number of additional "related instruction" credits can result in the revised version of the existing A.A.S. in Aviation Maintenance Technology. At this time, Helena College is requesting authorization to make these two C.A.S. credentials permanent.

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**ATTACHMENTS**

Academic Proposal Request Form  
Curriculum Proposal Form  
Intent to Plan Form



**Montana Board of Regents**  
**ACADEMIC PROPOSAL REQUEST FORM**

ITEM 176-1901-R0917 Submission Month or Meeting: September 13-14, 2017

Institution: Helena College University of Montana CIP Code: 47.0607 / 47.0608

Program/Center/Institute Title: Powerplant and Airframe C.A.S. degrees in Aviation Maintenance Technology

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*

**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. **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**

Helena College University of Montana requests authorization from the Montana Board of Regents of Higher Education to make permanent the temporary Powerplant and Airframe C.A.S. degrees in Aviation Maintenance Technology.

**Why**

To ensure alignment of Helena College credit hours with FAA-required classroom, laboratory, and lecture contact hours. This adjustment results in an increase from 80 to 96.25 credit hours. The A.A.S. in Aviation Maintenance will now be offered over five semesters (four regular semesters and one summer semester), making this a five-semester program still able to be completed in a two-year period. The two C.A.S. credentials have a shared core curriculum. The revised A.A.S. degree will remain as an option to the students, but the combination of these two stackable C.A.S. credentials with a minimal number of additional "related instruction" credits can result in the revised version of the existing A.A.S. in Aviation Maintenance Technology. Helena College submitted an Intent to Plan for these two C.A.S. degrees, a Level I to revise the A.A.S (173-1901-LI1116), and another Level I to temporarily establish the two C.A.S. degrees (173-1901-LI1116) in November 2016.

**Resources**

This change will require no additional resources.

**Relationship to similar MUS programs**

None.

**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]*

To better serve students and the aviation industry, Helena College submitted an Intent to Plan and received temporary approval for two C.A.S. degrees, a Level I to revise the A.A.S (173-1901-LI1116), and another Level I to establish the two C.A.S. degrees (173-1901-LI1116) in November 2016. The two C.A.S. credentials have a shared core curriculum. The revised A.A.S. degree will remain as an option to the students, but the combination of these two stackable C.A.S. credentials with a minimal number of additional “related instruction” credits will result in students earning the existing A.A.S. in Aviation Maintenance Technology.

- 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 Aviation maintenance program was the initial offering of Helena College back in the late 1930s, and continues to be a central piece of the College’s Trades offerings. The A.A.S. provides all KSAs to satisfy the FAA requirements for A&P licensure (following completion of the appropriate exam). The C.A.S. options will allow students to work in the field while working towards the A.A.S. degree, which is the ultimate goal of many, but not all, students. This supports all three Core Themes of the College—Access and Support, Academic Excellence, and Strong Community.

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

The A.A.S. curriculum was routinely updated in accordance with FAA requirements, after which two C.A.S. degrees were carved out of the existing curriculum. No other changes have been made. This is a packaging shift to create stackable certificates to meet the needs of students and the industry.

- 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	56 Airframe; 54 Powerplant
Credits in required courses offered by other departments	8 (same 8 suffice for both C.A.S. and A.A.S)
Credits in institutional general education curriculum	8 (same as above)
Credits of free electives	0
Total credits required to complete the program	64 Airframe; 62 Powerplant

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

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.

- Read and interpret Federal Aviation Regulations, aircraft service manuals, directives and bulletins to properly complete aircraft maintenance and repairs.
- Prepare logbook entries and prepare proper documentation for the repairs completed on an aircraft.
- Complete proper jacking procedures, ground handling and servicing on aircraft.
- Prepare weight and balance computations and properly prepare the required documentation.
- Evaluate sheet metal, composite structure, fabric covering and structural damage and prepared and complete the required repairs in accordance with approved repair procedures.
- Complete repair and maintenance on various airframe components and systems.
- Complete repair and maintenance on aircraft reciprocating and turbine engines.
- Return an aircraft to service after maintenance and repair.
- Inspect, remove and install non-repairable items such as propellers and aircraft instruments.

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]*

These two C.A.S. degrees “unbundle” the existing A.A.S. degree in Airframe and Powerplant. Allowing students to earn an interim credential provides the opportunity for gainful employment in the field while still in school to complete the remainder of the requirements for the A.A.S. degree. It also allows students flexibility to move into and out of the program while “locking-in” their educational accomplishments at more than one point.

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
None known	None known	None known

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

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

- 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]*

N/A

- 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]*

Fall 2018

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

Fall Headcount Enrollment					Graduates				
AY19	AY20	AY21	AY22	AY23	AY19	AY20	AY21	AY22	AY23
10	10	10	10	10	10	10	10	10	10

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

This is the rough historical average of our existing A.A.S. degrees, and given the additional credential and flexibility that it provides students, it is reasonable to surmise that most students will avail themselves of this opportunity.

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

15

- 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]*

Ultimately students are required to pass the FAA exam for each specialty, so a continued high pass rate will constitute success. Given that there is no resource (fiscal or other) requirement of this proposal, the ongoing operation of the A.A.S. degree program will entail success for the C.A.S. degrees, in terms of retention, completion, etc.

- 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]*

Routine testing driven by FAA requirements.

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

Routine assessment activity including written and performative tests, as well as summative assessment in the form of the FAA exams.

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**CURRICULUM PROPOSAL FORM**

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

Faculty work closely with FAA inspectors and other officials, as well as with their Aviation advisory council, to ensure high quality instruction and outcomes.

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

The FAA already authorizes the provision of instruction towards the A.A.S. and the C.A.S. curriculum is identical to that of the A.A.S.

**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 Aviation Maintenance program is currently in operation and encompasses all required elements for the degrees—physical space, tools, equipment, and other supporting resources. These new degrees will add no additional strain to the College or the Aviation 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]*

All required facilities, equipment, space, etc. are already in place and operational.

**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]*

All institutional support is currently in place and functioning.

- 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]*

N/A

**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, the library already supports this program with books, periodicals, and other resources as needed.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

- 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, the capacity exists and there are no further implications for support services, either for the Aviation students or for the rest of the student population.

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

There will be negligible impact on the financial situation of the College. This change is to increase student employability and credentialing, and will have minimal, if any, effect on the College's financial situation.

- 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	neutral	neutral	neutral
Expenditures	neutral	neutral	neutral
Net Revenue (revenues-expenditures)	neutral	neutral	neutral

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

There will be none.

- 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

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

- 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.

Existing fees will be maintained, resulting in no changes.

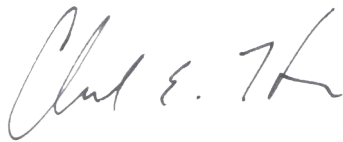
- 14.** Complete the budget template below with the following information:

- 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.

Signature/Date

**College or School Dean:**

**Chief Academic Officer:**



**Chief Executive Officer:**



**Flagship Provost\*:**

**Flagship President\*:**

\*Not applicable to the Community Colleges.



**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**I. PROJECTED STUDENT ENROLLMENT**

	FY <u>19</u>		FY <u>20</u>		FY <u>21</u>	
	FTE	Headcount	FTE	Headcount	FTE	Headcount
<b>Projected enrollments</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>

**II. REVENUE**

	FY <u>19</u>		FY <u>20</u>		FY <u>21</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request	neutral	neutral	neutral	neutral	neutral	neutral
2. Institution Funds	neutral	neutral	neutral	neutral	neutral	neutral
3. Federal	neutral	neutral	neutral	neutral	neutral	neutral
4. New Tuition Revenues from Increased Enrollments	neutral	neutral	neutral	neutral	neutral	neutral
5. Student Fees	neutral	neutral	neutral	neutral	neutral	neutral
6. Other (i.e., Gifts)	neutral	neutral	neutral	neutral	neutral	neutral
<b>Total Revenue</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>

*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**

	FY <u>19</u>		FY <u>20</u>		FY <u>21</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>A. Personnel Costs</b>						
1. FTE	neutral	neutral	neutral	neutral	neutral	neutral
2. Faculty	neutral	neutral	neutral	neutral	neutral	neutral
3. Adjunct Faculty	neutral	neutral	neutral	neutral	neutral	neutral
4. Graduate/Undergrad Assistants	neutral	neutral	neutral	neutral	neutral	neutral
5. Research Personnel	neutral	neutral	neutral	neutral	neutral	neutral

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

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

	FY <u>19</u>		FY <u>20</u>		FY <u>21</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>B. Operating Expenditures</b>						
1. Travel	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
2. Professional Services	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
3. Other Services	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
4. Communications	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
5. Materials and Supplies	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
6. Rentals	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
7. Materials & Goods for Manufacture & Resale	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
8. Other: _____	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
<b>Total Operating Expenditures</b>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>

	FY <u>19</u>		FY <u>20</u>		FY <u>21</u>	
	On-going	One-time	On-going	One-time	On-going	One-time
<b>C. Capital Outlay</b>						
1. Library Resources	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
2. Equipment	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>	<u>neutral</u>
<b>Total Capital Outlay</b>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>	<u><b>\$0</b></u>



**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**Appendix A – Proposed New Curriculum**

**Airframe Mechanics C.A.S. Required Courses**

<b>Summer Semester (offered Summer only)</b>		
AVMT100	Intro to Aviation Maintenance/Mathematics and Basic Physics	3
AVMT105	Basic Electricity	3.75
AVMT110	Aircraft Drawings/Weight and Balance	3.75
AVMT115	Materials and Processes/Fluid Lines and Fittings/Cleaning and Corrosion Control	3.5
AVMT120	Ground Operation and Servicing	2
AVMT125	Maintenance Publications/Forms & Records/Mechanic Privileges & Limitations	3
AVMT130	Basic Aerodynamics	2.75
<b>Total Semester Credits</b>		<b>21.75</b>
<b>First Semester AIRFRAME (offered Fall only)</b>		
AVMT140	Sheet Metal	4
AVMT145	Composites and Plastics	4
AVMT150	Wood Structures	2
AVMT155	Aircraft Covering/Aircraft Finishes	2
AVMT160	Aircraft Welding	3
***M111T	Technical Mathematics	3
**WRIT 121T	Technical Writing	3
<b>Total Semester Credits</b>		<b>21</b>
<b>Second Semester AIRFRAME (offered Spring only)</b>		
AVMT165	Sheet Metal	3
AVMT170	Composites and Plastics	3
AVMT205	Wood Structures	1.75
AVMT210	Aircraft Covering/Aircraft Finishes	3
AVMT215	Aircraft Welding	2.25
AVMT220	Aircraft Instrument Systems/Communication and Navigation Systems	2.25
AVMT135	Assembly and Rigging/Airframe Inspection	4
**HR 100T	Human Relations	2
<b>Total Semester Credits</b>		<b>21.25</b>
<b>Total Program Credits</b>		<b>64</b>

**Powerplant Mechanics C.A.S. Required Courses**

<b>Summer Semester (offered Summer only)</b>		
AVMT100	Intro to Aviation Maintenance/Mathematics and Basic Physics	3
AVMT105	Basic Electricity	3.75
AVMT110	Aircraft Drawings/Weight and Balance	3.75
AVMT115	Materials and Processes/Fluid Lines and Fittings/Cleaning and Corrosion Control	3.5
AVMT120	Ground Operation and Servicing	2
AVMT125	Maintenance Publications/Forms & Records/Mechanic Privileges & Limitations	3
AVMT130	Basic Aerodynamics	2.75
<b>Total Semester Credits</b>		<b>21.75</b>
<b>First Semester POWERPLANT (offered Fall only)</b>		
AVMT225	Reciprocating Engines and Systems I	5.5
AVMT230	Reciprocating Engines and Systems II	5.5
AVMT240	Engine Instrument Systems	3
***M111T	Technical Mathematics	3
**WRIT 121T	Technical Writing	3
<b>Total Semester Credits</b>		<b>20</b>
<b>Second Semester POWERPLANT (offered Spring only)</b>		
AVMT235	Turbine Engines and Systems	8
AVMT245	Engine Electrical Systems/Auxiliary	3.75
AVMT250	Engine Fire Protection Systems	2.5
AVMT255	Propellers and Unducted Fans	4
HR100T	Human Resources	2
<b>Total Semester Credits</b>		<b>20.25</b>
<b>Total Program Credits</b>		<b>62</b>



**Montana University System**  
**INTENT TO PLAN FORM**

Program/Center/Institute Title: **Aviation Maintenance Technology C.A.S. (two stackable credentials)**

Campus, School/Department: **Helena College University of Montana**

Expected Submission Date: **11/18/2016**

Contact Name/Info: **Tammy Burke, Trades Division Chair, tammy.burke@umhelena.edu, 406-447-6352**

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/preparingacademicproposals.asp>.

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

Helena College University of Montana began operations in 1939 when it first offered an aviation training program in conjunction with the military. This program has sustained over 75 years of growth and change and it is currently the only educational program in the State of Montana that prepares students to become licensed Airframe and Powerplant mechanics. This program's requirements and hours are strictly maintained by the Federal Aviation Administration (FAA) in accordance with rigorous FAA standards. The program at Helena College must provide high quality instruction and meet the demanding performance standards of the FAA in order to continue to operate. The current Aviation program was due for a thorough review and curriculum alignment to ensure that credit hours match the required classroom hours according to the FAA. Each course was reviewed and credit hours aligned with FAA requirements. These updates were approved by the Helena College Academic and Curriculum Standards Committee of Helena College and the Chief Academic Officer who recommended the changes for submission to the MUS Board of Regents.

Current students are able to obtain an A.A.S. degree upon completion of this program. Due to this review, the existing Aviation program is being adjusted to ensure alignment of Helena College credit hours with FAA-required classroom, laboratory, and lecture contact hours. This adjustment results in an increase in credit hours by 15.75 credits. The A.A.S. in Aviation Maintenance will now be offered over five semesters (four regular semesters and one summer semester), making this a five-semester program still able to be completed in a two-year period. Therefore, Helena College is hereby submitting a Level I request for authorization to revise the A.A.S. in Aviation Maintenance Technology (See BOR Item 1901-LI1116) to address the increase in credit hours required by the FAA.

To better serve students and the aviation industry, Helena College plans to establish two C.A.S. credentials with a shared core curriculum, a C.A.S. in Aviation Airframe and a C.A.S. in Aviation Powerplant. The revised A.A.S. degree will remain as an option to the students, but the combination of these two stackable C.A.S. credentials with a minimal number of additional "related instruction" credits can result in the revised version of the existing A.A.S. in Aviation Maintenance Technology. In order to have the stackable C.A.S. degrees available to students preregistering for Fall 2017, Helena College is submitting a Level I request to establish two temporary C.A.S. degrees (See BOR Item 173-1902-LI1116), as well as an Intent to Plan which will be followed by submission of the Level II proposal for the two stackable C.A.S. credentials in March 2017.



**Montana University System**  
**INTENT TO PLAN FORM**

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

In a recent article by Boeing, they have predicted that, between the years of 2016 and 2035, they will need 679,000 aviation maintenance technicians (<http://www.boeing.com/commercial/market/long-term-market/pilot-and-technician-outlook/>). The Department of Labor and Industry also shows a demand for 137,300 technicians nationwide in 2014 with a consistent outlook (<http://www.bls.gov/ooh/installation-maintenance-and-repair/aircraft-and-avionics-equipment-mechanics-and-technicians.htm>). Our current program has maintained consistent enrollment over the last ten years and continues to be a stable program at Helena College. We plan to continue the A.A.S. program, as well as to offer two separate C.A.S. degrees to allow more student options and to support industry.

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

By adding the two C.A.S. degree programs, we are fulfilling our mission of providing a lifelong educational opportunity for those wishing to be employed in the field of aviation maintenance. This program will continue to strengthen workforce needs and be of the highest quality. Offering students a choice of the C.A.S. or A.A.S. should also provide the student with more options and increase retention and completion.

- 4) Describe how the program/center/institute overlaps, compliments, or duplicates existing efforts in the MUS.

There are currently no other institutions in the State of Montana that offer either an A.A.S. or C.A.S. degree in Aviation Maintenance.

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: March 10, 2017

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