Montana University System
INTENT TO PLAN FORM

Program/Center/institute Title: Request for Authorization to establish a new Master of Science in Cybersecurity

Gianforte School of Computing, Montana State University, Bozeman

Expected Submission Date: Spring 2020

Contact Name/Info: Dr. Clemente Izurieta, clemente.izurieta@montana.edu, Dr. Brock LaMeres, lameres@montana.edu

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

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

This Intent to Plan provides information regarding a proposal to establish a Master of Science degree in Cybersecurity. The proposed program would be housed under the Gianforte School of Computing in the Norm Asbjornson College of Engineering (NACOE). This proposal would create an academic program that caters to students with a Bachelor of Science background in computer science, computer engineering and possibly other STEM backgrounds.

MSU is proposing a MS (professional level) degree. To understand this proposal, first having the context surrounding bachelor's degrees in this area is helpful. Bachelor’s degrees in cybersecurity are almost non-existent, and the ones offered tend to focus on enhancing vocational and operational skills, not foundational CS or engineering knowledge. Most undergraduate level cybersecurity programs tend to focus on operational/vocational skills and are offered through certificates. There are many cybersecurity programs offered at the MS (professional level) from schools like George Mason, NYU and Columbia. Such MS programs tend to focus on either management, policy, or the more IT related topics that complement a technical bachelor's degree. These programs are best described as professional and provide terminal degrees for established business individuals, many of whom may not have STEM backgrounds.

MSU’s proposed degree caters to students with a STEM background and is not intended to be a terminal degree, but still provides a path to doctoral studies. We argue this is the best alternative to meet Montana’s workforce needs in this area. It will be a rigorous academic program with options for certifications and options for further academic pursuit. The MS in cybersecurity would require students to take the same number of credits and fulfill the same requirements as a traditional MS in CS. This program would allow MSU BS students to take cybersecurity courses as part of their electives while reserving up to 12 credits during the BS as they transition into an MS program through our seamless BS/MS (4+1) option. Students in either a BS or MS could supplement their studies by taking additional courses from MSU’s Gallatin College that provide specific cybersecurity certifications. Although certifications are not necessary in academic settings, they are a necessity in industry.

best alternative to create positive impact in workforce development in the state of Montana is to offer a
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).

The advancement of cyber adversaries has led to increased frequency and complexity of cyber-attacks on everything from U.S. military systems to the U.S. voting infrastructure. By 2021 it’s expected that 3.5 million cybersecurity positions will be unfilled [1] and there is great need to automate cybersecurity as completely as possible. According to the U.S. Bureau of Labor Statistics (BLS), the median annual wage of cybersecurity analysts is $98,350 [6]. The creation of this new MS degree will help meet workforce demand in the area of cybersecurity in the state of Montana.

The development of the Advanced Research Laboratory (ARL) at Montana State University has been successful at procuring significant funding from private industry, DHS and DoD. More than $20M has been booked since 2018. A significant portion of these funds were appropriated to pursue research in developing cybersecurity solutions in both the Gianforte School of Computing and the Department of Electrical & Computer Engineering at Montana State University. Coupled with local industry such as Hoplite [5], the Montana economy finds itself in a position where a pipeline of qualified workers is not readily available nor is there sufficient graduate students with the necessary background to conduct research in the area of cyber. To complement a lucrative field, the development of qualified workers is needed, and this program will not only generate qualified scientists, but also engineers with the necessary skills to address Montana’s and the nation’s future cybersecurity needs.

There exists a large amount of information on curricula development and various cybersecurity programs from certificates to the MS level. Our goal with this program is to provide a balance between vocational and academic skills that enable the development of a rigorous academic STEM program in cybersecurity while allowing students the opportunity to earn additional certifications through either MSU’s Gallatin College or UM’s Missoula College.

We propose to develop a program that serves the Montana workforce well. This entails alignment with certain standards in the field. These standards include:

- Alignment with the NICE framework [2]
- Meets certification criteria from the National Security Agency/Control Security Service (NSA/CSS) and Department of Homeland Security (DHS) – Center of Academic Excellence Cyber Defense (CAE-CD) [3]
- Alignment with curricula recommendations from ACM and IEEE [4].
- Allows students to sit for a subset of certification exams (CompTIA exams)

References
Montana University System
INTENT TO PLAN FORM

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

This proposal is in alignment with Montana State University’s “Choosing Promise” strategic plan (https://www.montana.edu/strategic plan). Specifically:

i. Goal 1.2. Expanding high quality graduate education. The MS in Cybersecurity program will increase the number of graduate students while serving the state of Montana in an area of crucial need. An MS in Cybersecurity supports Goal 1.2’s aim to increase the number of research doctoral degrees from 66 to 90 and the number of Master’s degrees from 566 to 650.

ii. Goal 2.1. Enhance the significance and impact of scholarship. The MS in Cybersecurity contributes directly to one of the four grand research challenges articulated in the strategic plan, namely “Securing the future of Montana.” The MS in Cybersecurity will also help with the aims of increasing expenditures by 25% by 2022 and increasing the creation/authorship of the number of scholarly products by 10% each year.

iii. Goal 3.2. Grow mutually beneficial partnerships across Montana. The MS in Cybersecurity will help develop a capable workforce that is able to meet local, state, regional and national needs. Students, industry, and academics from all across Montana will benefit.

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

The MS program described herein does not overlap nor duplicate any other program in the MUS system. Missoula College currently offers a certificate of technical skills in cybersecurity (CTS), the University of Montana, in collaboration with Missoula College, and Excelsior College offer a BS in Cybersecurity for students with an AAS degree, and Gallatin College will begin offering a certificate in the Bozeman campus. These programs would complement the proposed program by allowing our MS students to optionally obtain certifications. These other programs could also serve as a possible source of future students for the proposed MS in Cybersecurity program.

Signature/Date

College/School Dean: 7/10/19
Chief Academic Officer: 7-10-19
Chief Executive Officer:
Flagship Provost*: 7-10-19
Flagship President*: July 19, 2019
*Not applicable to the Community Colleges

Date of Final Review:
When submitting the proposal to the BOR, include this signed form with the Level II request.