

# Montana Technological University Alignment Plan

**November 30, 2018**

**Version 1.0 Initial Recommendations**

DRAFT

<b>Montana Technological University Alignment Plan</b> .....	1
Alignment Plan Introduction .....	5
Wire Executive Summary.....	6
Program Prioritization Committee: Overview of Process .....	7
Guideposts for Program Prioritization.....	10
Guidepost 1.....	10
Guidepost 2.....	10
Guidepost 3.....	10
Guidepost 4.....	10
Program-by-Program Academic Recommendations .....	11
Civil Engineering (CE) Department .....	11
Electrical Engineering (EE) Department.....	12
Environmental Engineering (EnvE) Department.....	13
Geophysical Engineering (GeopE) Department.....	14
Geological Engineering (GeolE) Department.....	16
Mechanical Engineering (ME) Department .....	17
Metallurgy and Materials Engineering (MME) Department .....	19
Mining Engineering (MinE) Department .....	20
Petroleum Engineering (PetE) Department.....	21
Safety Health & Industrial Hygiene (SHIH) Department.....	22
Biological Sciences Department .....	23
Business Information and Technology Department.....	24
Chemistry and Geochemistry Department.....	26
Computer Science/Software Engineering Department.....	28
Data Science and Statistics Department.....	30
Healthcare Informatics Department.....	32
Liberal Studies Department .....	34
Mathematical Sciences Department .....	36
Networking Technology Department .....	38
Nursing Department .....	39
Professional and Technical Communication Department .....	40
Writing Department.....	42
Program: Business Technology (BUS) .....	43

Program: Accounting (ACTG) .....	44
Program: Network Technology (NETW) .....	45
Program: Nursing Assistant (CNA) .....	46
Program: Medical Assistant (AHMA) .....	47
Program: Radiologic Technology / Pre-Radiologic Technology (RADT) (PRAD) .....	48
New Program: Behavioral Health Technician (BHT) .....	49
Program: Metals Fabrication (MFAB) .....	50
New Program: Precision Machining (MCH) .....	51
Program: Automotive (AUTO) .....	52
Program: Construction (CNST).....	53
Program: Drafting (DRFT) .....	54
Program: Civil Engineering Technology (CET).....	55
Program: Line Program (LINE) .....	56
Department: General Studies .....	57
Department: ACES .....	58
Program: Associate of Science (AS) .....	59
Unit-by-Unit Non-Academic Recommendations .....	60
Chancellor Office .....	60
Research Office and Graduate School .....	61
Academic Center for Excellence .....	62
Campus Life.....	63
Enrollment Services .....	64
Financial Aid .....	65
Student Development/Counseling .....	66
Undergraduate Recruitment .....	67
Alumni Engagement.....	68
Career Services .....	70
Public Relations & Marketing .....	72
Facilities .....	74
Human Resources .....	75
Finance & Budget.....	76
Information Technology Services .....	77
Institutional Research .....	78

Environmental Health & Safety .....	79
Distance Learning .....	80
Library .....	81
Institute for Educational Opportunities.....	82
Athletics .....	83
Summary .....	84
APPENDIX A. Complete WIRE Recommendations .....	88
Executive Summary .....	88
History of WIRE .....	90
Recommendation I: .....	92
Recommendation II: .....	96
Recommendation III: .....	99
Recommendation IV: .....	101
Proposed Timeline .....	103
By the end of FY 2019 – .....	103
Within 1 year – .....	103
Within 5 years - .....	103
Within 10 years – .....	104

## Alignment Plan Introduction

This document is being released as the initial recommendations for the overall Montana Technological University alignment plan. An executive summary from the Workgroup for Institutional Realignment for Excellence (WIRE) provides the overarching recommendations. The complete and final WIRE recommendations are included in Appendix A. Using the WIRE recommendations, the Deans from the three academic colleges developed a set of Guideposts that have been used to form specific academic recommendations. These Guideposts have been presented to both the Program Prioritization Committee (PPC) and the Faculty Senate. Using the Guideposts, initial specific recommendations are presented academic program-by-program and will serve as the basis for discussion.

The Program Prioritization Committee (PCC) has two sub-committees, one composed of the academic deans, and the other composed of individuals responsible for the leadership of the non-academic units within the University. The role of the PPC has been to gather both quantitative and qualitative data regarding academic and non-academic units, determine the alignment process, provide input and recommendations regarding prioritization of resources, and ultimately recommend acceptance or non-acceptance of the Alignment Plan.

This Alignment Plan is authored in total by those on the WIRE committee, the Provost, the Academic Deans, the Vice Chancellors and the Chancellor. In whole, WIRE, PPC, and their recommendations will result in Montana Tech aligning in a strategic manner to reductions in resources. More importantly, the alignment plan and prioritization is needed to take full advantage of the BOR Special Focus designation and the subsequent name change to Montana Technological University.

## Wire Executive Summary

At their March 10, 2017 meeting, the Montana Board of Regents (BOR) approved a fourth institutional classification for higher education units in the state. The new classification, Special Focus Four-Year Universities, of which Montana Tech is the only unit, was added to the previous three classifications: Two-Year Colleges, Four-Year Regional Universities, and Research Doctoral Universities. Prior to its new classification, Montana Tech was included in the Four-Year Regional Universities classification. This new classification was due in part to the unique mission and high quality of Montana Tech and a recognition of the opportunities a Special Focus designation might afford Montana Tech.

As a response to its new institutional classification by the BOR, Chancellor Blacketter formed WIRE (Workgroup for Institutional Realignment for Excellence) in late March 2017. The charge given to WIRE by Chancellor Blacketter was to “define what it means to Montana Tech to be classified as the only Special Focus Four-Year University in the state.” The 13-member committee, comprised of faculty, staff and administrators, met with a wide range of campus entities to discuss the impact of the new classification. Since April of 2017, WIRE has met with numerous groups both on and off campus to create a set of recommendations for Chancellor Blacketter. This report contains the recommendations of the group.

**Recommendation I: Montana Tech embraces the Special Focus BOR designation as a premiere Science and Engineering institution dedicated to meeting the changing needs of society**

**Recommendation II: Montana Tech will have a nationally competitive applied research culture**

**Recommendation III: Our approach to curriculum will focus on integrated problem solving**

**Recommendation IV: Montana Tech will grow the STEM workforce in Montana and beyond**

Montana Tech recognizes the need for an informed citizenry prepared to understand issues related to energy, natural resources, environment, water, data, and health. We recognize that the highly technical nature of these problems presents an obstacle to creating that informed citizenry. We recognize that Montana Tech’s mission, legacy, culture, and values promote proven solutions to these challenges.

**Montana Tech embraces the opportunity to pursue its special focus designation by becoming the science and engineering institution of choice to solve these problems now and in the future.** Montana Tech will have an ethos of educating the whole person through intensive intellectual dialogue between students and faculty across diverse spheres of inquiry.

Fulfilling our vision will require several institutional changes including:

- An institutional name that reflects our values, vision, and aspired national stature. The “of the University of Montana” invokes a regional scope that is not reflective of our role as a Special Focus Institution. WIRE strongly supports that our name change to match our brand of “Montana Tech”.
- The Chancellor should continue to report directly to the Commissioner level. This reporting line gives Montana Tech the ability to pursue collaborations with all other institutions in the MUS and beyond.
- Entrance standards should measure the potential of students to succeed at Montana Tech.
- A physical and organizational restructuring that will support instructional collaboration, increased research output, and a strong general education curriculum

- Appropriate tuition/fee rates to enable Tech to offer nationally competitive programs
- Mission driven MS and PhD programs in focused areas of Science and Engineering
- Curricular modification/development to facilitate effective multi-disciplinary and experiential learning for all majors
- Appropriate faculty pay scales, benefits, tenure and promotion standards, workload, and incentives to attract and retain scholars

Some of these actions have obviously already been achieved fully or in part, with the rest still needing to be addressed or completed.

### Program Prioritization Committee: Overview of Process

1/4/2018	Campus-wide meeting to introduce the Program Prioritization concept to the campus.
1/24/2018	Program Prioritization Committee's (PPC) first meeting. Chancellor Blacketter provides direction/charge.
1/31/2018	PPC began collecting metrics/data: regularly reported data sets such as IPEDS, Delaware study, etc. Discussed metrics at subsequent meetings.
2/28/2018	Committee members "rank" academic programs based on data sets. The identity of the academic programs was not revealed to the committee members.
3/28/2018	The PPC "ranking process" resulted in multi-colored ranking matrix that was presented to campus. Academic programs were identified.
4/25/2018	PPC creates academic subcommittee to review academic programs.
5/2/2018	PPC creates non-academic subcommittee. Chancellor charges academic subcommittee to reduce student/faculty ratio from 14:1 (current level) to 16:1.
8/29/2018	Chancellor met with PPC on August 29. Charged committee with cutting \$500,000 - \$1,000,000
10/5/2018	Deans present Guideposts and Metrics to Faculty Senate.
10/19/2018	Deans release data sets that will drive their review of academic programs.
10/24	PPC considers feedback from faculty on the data released from the deans. PPC develops proposed process/timeline for Oct-Dec time period. December 14 <sup>th</sup> identified as "due date" for final report.
11/21	PPC finalizes timeline for report.
11/30/2018	Draft initial report is released to the campus.

The Academic-side of the campus was the focus of the PPC from January through May. The Non-Academic side of the campus was the focus from May through August and Academics was again the focus from August to present. The PPC participated in presentations by the Foundation, WIRE, Institutional Research, Registrar, Deans, and Vice Chancellors.

The PPC committee felt that the prioritization process should be transparent and data/metric driven. The agendas and overviews of the meetings were sent to the campus for each meeting. The Academic subcommittee presented their guideposts and data to the PPC and Faculty Senate.

PPC Members:

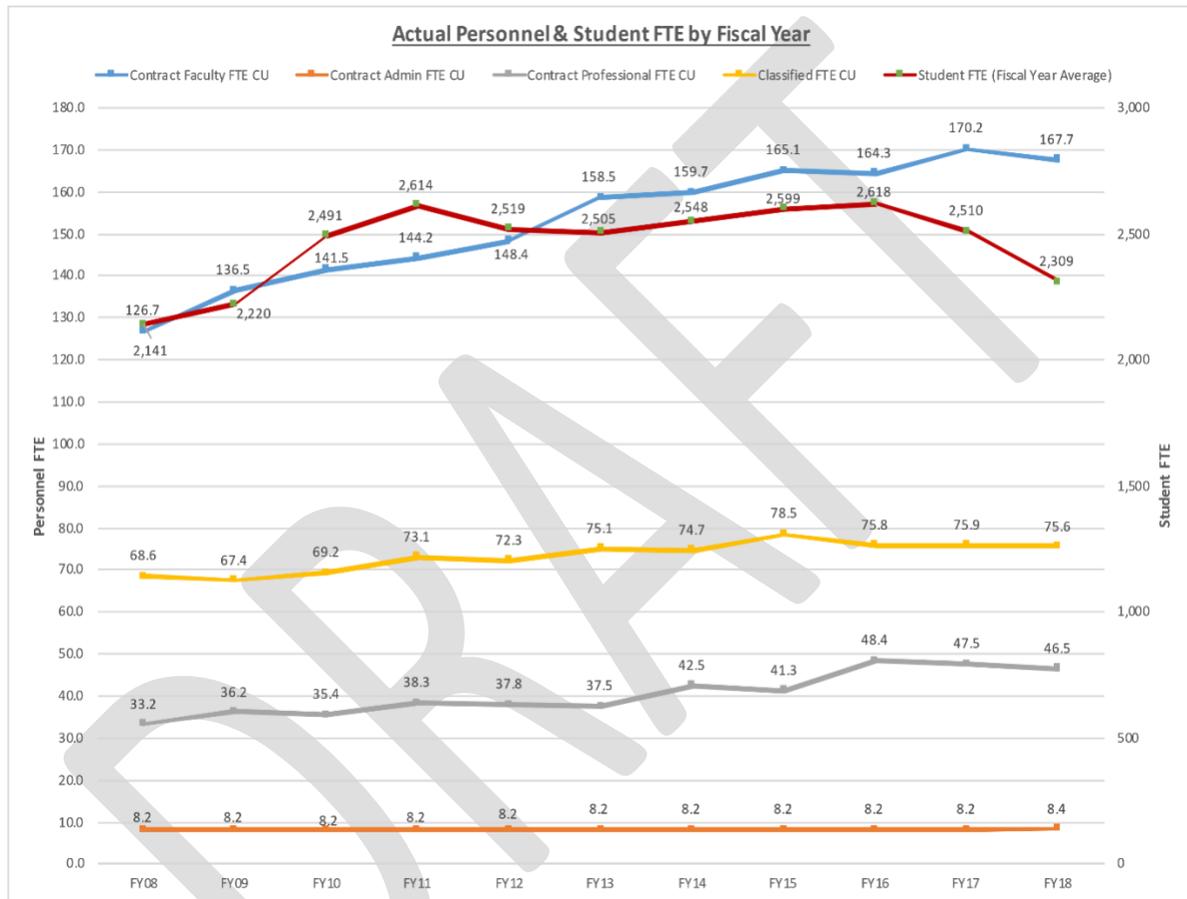
Doug Abbott (Chair)	Steve Gammon	Chance Maes	Isaiah Robertson
Chris Danielson	Dave Gurchiek	Joe McClafferty	Marv Speece
Leslie Dickerson	Bev Hartline	Peggy McCoy	Dan Trudnowski
Charie Faught	Melissa Kump	Vicki Petritz	Carrie Vath
			Brant Wright

Melissa Kump is an Ex-Officio (non-voting) member while Maes and Robertson were selected by ASMT.

DRAFT

The graph below was presented to the campus at the January 4, 2018 campus forum. A review of the graph provides insight into a number of areas:

- Montana Tech's student/faculty ratio has decreased from 16.9 in FY 08 to 13.8 in FY 18.
- Enrollment has grown 7.8% from FY 08 to FY 18.
- The number of FTE faculty has increased 32.4% from FY 08 (126.7 FTE) to FY 18 (167.7 FTE).
- The number of classified FTE employees has increased 10.2% from FY 08 (68.6 FTE) to FY 18 (75.6 FTE).



- The number of contract professionals has increased 40.1% from FY 08 (33.2 FTE) to FY 18 (46.5). A portion of this increase is attributed to a reclassification effort that the campus underwent wherein classified employees were converted to contract professionals.
- The number of contract administrators has grown 2.4% from FY 08 (8.2 FTE) to FY 18 (8.4 FTE).

## Guideposts for Program Prioritization

The foundation for the guideposts are the WIRE recommendations.

### Guidepost 1

- Based on WIRE Recommendation 1
- Science and Engineering (S&E) programs are given special consideration
  - 4-year and graduate S&E programs will be given a higher priority when considering program elimination versus re-organization/support/enhancement.
  - CIP-code S&E specific programs include
    - All ABET accredited engineering programs (10 total)
    - MPEM
    - Computer Science
    - Chemistry
    - Biology
    - Math, Statistics, and Data Science
    - Network Technology

### Guidepost 2

- Based on WIRE Recommendation 1 and 4
- 2-year career technical programs are given special consideration
  - Priority will be placed on 2-year programs that have the potential:
    - to matriculate to S&E 4-year programs (BS, BAS),
    - to draw students from out-of-state
  - OR
  - that prepare students for careers in high-demand middle skill STEM occupations
    - Middle Skill Occupations: occupations that require some post-secondary education but less than a four-year degree
    - STEM defined by O\*NET

### Guidepost 3

- Based on WIRE Recommendations 1 and 2
- S&E programs with historically high research productivity and potential for future strong research are given higher priority.

### Guidepost 4

- Based on WIRE Recommendations 1 and 4
- Strategic alignment of 2-year and 4-year programs
  - Initiate process to integrate and rebrand Highlands College
  - Align related programs between North and South Campuses to create seamless transitions for students, faculty and administrators.

## Program-by-Program Academic Recommendations

### Civil Engineering (CE) Department

#### Degrees offered

- BS Civil Engineering (to be accredited)
- BS General Engineering, Civil option (being transitioned out)
- Participates in the MS General Engineering

2018-19 faculty head count = 5

#### *Guideposts and Metrics*

- **Guidepost 1:** Civil Engineering is designated as an S&E program. It represents a new area for Tech and merits investment as it complements our heritage natural resource area.
- **Guidepost 3:** Civil Engineering does participate in research and has an active graduate degree. The level of funded research is relatively low.
- **Enrollment and Teaching:** Civil Engineering has a solid enrollment and strong enrollment growth. The potential enrollment is very high. Because of this, CE has relatively high teach loads.
- **Expenditures:** CE/ME ranks at the top of expenditure rankings. It is difficult to separate ME so not much can yet be read from this.
- **Research:** CE is moderately weak in research.

#### *Overall observations*

CE has the potential to be a high-enrollment flywheel program for Tech. Achieving ABET accreditation and faculty stabilization is critical. With the maturing of the faculty, research is expected to improve.

#### *Initial Thoughts*

- Possibly re-organized offices within the S&E building to help CE “show” better. This will help recruiting to push CE to near 200 students.

#### *Net Change in Faculty from 2018/19*

None. Complete the current search being conducted.

## Electrical Engineering (EE) Department

### Degrees offered

- BS Electrical Engineering
- MS Electrical Engineering

2018-19 faculty head count = 4

### Guideposts and Metrics

- **Guidepost 1:** Electrical Engineering is designated as an S&E program. Their focus area of power systems and much of their research focuses in the integration of renewable energy into the grid. This is highly complementary to the heritage engineering programs at Tech.
- **Guidepost 3:** EE participate in research and has an active graduate degree. The level of funded research is very high.
- **Enrollment and Teaching:** EE has moderately low enrollment with a slight 3-year decline. EE does teach some service primarily for ME with the service teaching loads strong and growing. The program teaching loads are moderately low (near 250 SCH per faculty when EE had 5 faculty lines).
- **Expenditures:** EE expenditures are very close to national metrics.
- **Research:** EE is very strong in C&G funding. The MS enrollment is low.

### Overall observations

EE is a focused department which has resulted in very strong research and industry relationships. The only negative component is the moderately low enrollment. Ideally, EE should have an enrollment near 100 to 120 FTE; they are near 85. A serious issue that impacts enrollment and recruiting is the fact that EE does not show well as it is housed in the attic of Main Hall. Also, EE is down to 4 faculty with an open position which is at a critically low level.

### Initial Thoughts

- Move EE and Mechanical Engineering to ELC 3<sup>rd</sup> floor to better utilize the NRRC and to improve how they “show”. The EE and ME departments will soon have nearly all their labs in the NRRC. Both have potential to grow enrollment as indicated by national and state trends. Additionally, these two programs have strong synergistic connections.

The NRRC is a showcase building for Tech and primarily houses ME and EE labs. But, there is a lack of traffic and “buzz” within the NRRC. The NRRC houses high-volume labs but it is nearly empty when labs are not in session. This is because most the students using the NRRC are ME and EE majors. They choose to congregate and study near their professors’ offices which are in the S&E and Main Hall. None of the programs currently housed in the ELC (which is connected to the NRRC) enter the NRRC because their respective programs do not utilize any of the NRRC lab space.

- Fill the vacancy from Trudnowski becoming Dean. EE faculty may need to teach some physics courses.

### Net Change in Faculty from 2018/19

An addition of 1 faculty line.

## Environmental Engineering (EnvE) Department

### Degrees offered

- BS Environmental Engineering
- MS Environmental Engineering
- Masters in Project Engineering Management (MPEM)

2018-19 faculty head count = 6

### *Guideposts and Metrics*

- **Guidepost 1:** Environmental Engineering is designated as an S&E program. It is one of the oldest Environmental Engineering programs in the US.
- **Guidepost 3:** EnvE participates in research. Its C&G funding has been very low. Its MS enrollment is relatively strong.
- **Enrollment and Teaching:** EnvE enrollment is low. This coupled with having 6 faculty results in significantly low teaching SCHs. EnvE primarily teaches within its own program with very little service load.
- **Expenditures:** EnvE expenditures are very high compared to national metrics. This is primarily caused by the low enrollments and teaching SCHs.
- **Research:** EnvE is very weak in C&G funding; but, the MS enrollment is high. Research funding needs to increase.

### *Overall observations*

EnvE has low enrollment but not significantly low. This low enrollment coupled with nearly no service teaching, 6 faculty lines (4 of them new faculty), and low C&G production creates a significant problem. Some of the new faculty have the potential for building funded research. The MPEM is very low enrollment and seems to be an extra weight on the program.

### *Initial Thoughts*

- Reduce the number of faculty lines in the department to 5.
- Participate in service load for the SME.
- Develop a curriculum and standards to distinguish the department from Environmental Sciences and Studies programs throughout the U.S. This includes a strong focus in ground water.
- Remove the MPEM from the department. The MPEM should be re-scoped as a Masters in Project Management and delivered via the Graduate School.
- EnvE needs to contribute to the service load in SME.

### *Net Change in Faculty from 2018/19*

A reduction of 1 faculty line.

## Geophysical Engineering (GeopE) Department

Degrees offered:

- BS Geophysical Engineering
- Participates in the MS Geosciences.

2018-19 faculty head count = 6. This includes 2 physic instructors.

### *Guideposts and Metrics*

- **Guidepost 1:** Geophysical Engineering is designated as an S&E program. It is highly specialized and core to our natural resource heritage.
- **Guidepost 3:** GeopE is active in research. Its C&G funding is moderate and the MS enrollment is strong.
- **Enrollment and Teaching:** GeopE BS enrollment is significantly low resulting in very low program SCHs (12 FTEs in Fall 2018). The department delivers a very large service component in the physics courses. But, this service component has decreased significantly due to a drop in the PET enrollment.
- **Expenditures:** GeopE expenditures are below the national metrics due to the high service teaching.
- **Research:** GeopE is moderate low in C&G funding. The graduate enrollment is a bright spot.

### *Overall observations*

GeopE delivers only one of two BS Geophysical Engineering programs in the nation. The GeopE BS is a very specialized degree and it is very difficult to recruit students into this program. This low enrollment is a heavy weight on the department. The heavy service component is bolstered by having two full-time physics instructors within the department.

### *Initial Thoughts*

- Eliminate the BS in Geophysics degree. Replace it with an MS in Geophysical Engineering. GeopE is a highly specialized degree and would be best served by being a focused graduate program only. Develop the MS curriculum to specifically recruit students from Geological Engineering, Geology, and Petroleum Engineering.
- Eliminate the minor in Physics.
- Reduce and re-organize the Physics curriculum per:
  - Reduce the number of PHSX 234, 235, and 237 sections from 4 per year to 3 per year each.
  - Eliminate PHSX 322 and PHSX 453;
  - Move PHSX 423 to Electrical Engineering.
- Reduce the number of faculty dedicated to the GeopE MS degree to two faculty. Pursue a third position via an endowed chair from industry. The likely focus of this position is in petro-physics.

- Merge the GeopE department with the GeolE department. The GeolE/GeopE department would be the heart of our geosciences expertise at Tech. The GeolE BS degree should consider an option in Geophysics.
- Evaluate where the Physics instructors are housed. Faculty from other engineering programs must contribute to teaching physics classes. GeopE faculty will not be expected to solely deliver the physics curriculum.

*Net Change in Faculty from 2018/19*

A reduction of 2 faculty lines.

DRAFT

Geological Engineering (GeolE) Department  
Degrees offered:

- BS Geological Engineering
- Participates in the MS Geosciences

2018-19 faculty head count = 5

*Guideposts and Metrics*

- **Guidepost 1:** Geological Engineering is designated as an S&E program. It is core to our natural resource heritage.
- **Guidepost 3:** GeolE is a leader in research. Its C&G funding is relatively strong and its MS enrollment is the top at Tech.
- **Enrollment and Teaching:** GeolE BS enrollment is low resulting in low program SCHs. But, the department delivers a very large service component to teaching (primarily GEOL 101). This service component has decreased significantly due to some programs dropping GEOL 101 as a requirement and the drop in PET enrollment.
- **Expenditures:** GeolE expenditures are below the national metrics. This is primarily caused by the high service teaching.
- **Research:** GeolE is strong in C&G funding and is very strong in MS enrollment.

*Overall observations*

GeolE does an excellent job in the research area. One of the best research groups at Tech. Teaching levels are significantly decreasing primarily due to drop in service demand from the drop in PetE enrollment.

*Initial Thoughts*

- See recommendations for GeopE. This may result in curricular changes within GeolE. For example, a Geophysics option in the BS program.
- Replace the opening that will be created by a retirement in the department.

*Net Faculty Change from 2018/19*

None.

## Mechanical Engineering (ME) Department

### Degrees offered

- BS Mechanical Engineering (to be accredited)
- BS General Engineering, Mechanical option (being transitioned out)
- Participates in the MS General Engineering
- Participates in PhD in Material Science

2018-19 faculty head count = 7

### Guideposts and Metrics

- **Guidepost 1:** Mechanical Engineering is designated as an S&E program. It represents a new area for Tech and merits investment as it complements our heritage natural resource area.
- **Guidepost 3:** Mechanical Engineering does participate in research and has active graduate degrees.
- **Enrollment and Teaching:** Mechanical Engineering has a high enrollment. Growth appears flat for the past 3 years; but, it is difficult to separate ME and CE majors. They are currently operating near 30/1 student-to-faculty ratio, a very high level. They also teach considerable service. The potential enrollment growth is very high. For example, ME is by far the highest enrolled engineering degree in the US. Also, MSU has over 1,000 ME majors.
- **Expenditures:** CE/ME ranks at the top of expenditure rankings. It is difficult to separate ME so not much can yet be read from this.
- **Research:** ME C&G revenue is low compared to the C&G salaries because nearly all their research has been thru the ARL grant. They need to establish their own competitive research funding. The department has several newer faculty with tremendous research potential, especially in the materials/nano area.

### Overall observations

ME is currently a high enrollment program with 229 FTE enrollment and has the potential to be over 300. And, it is still a very new program that is not even yet accredited. Achieving ABET accreditation is absolutely critical. With the maturing of the faculty, research will grow. The investments in the nano and material science areas will have resulted in newer faculty with considerable research potential.

The ME department does not show good and this will impact potential recruitment and enrollment growth. We need to leverage the new NRRC to facilitate recruitment into ME.

### Initial Thoughts

- Move EE and ME to ELC 3<sup>rd</sup> floor to better utilize the NRRC and to improve how they “show”. Both these programs will soon have nearly all their labs in the NRRC. Both have potential to grow enrollment as indicated by national and state trends. Also, these two programs have strong synergistic connections to each other and MME.

The NRRC is a show-case building for Tech and primarily houses ME and EE labs. But, there is a lack of traffic and “buzz” within the NRRC. The NRRC houses high-volume labs but it is nearly empty when labs are not in session. This is because currently most the students using the NRRC are ME and EE students. They choose to congregate and study near their professors’ offices which are in the S&E and Main Hall. None of the programs currently housed in the ELC (which is

connected to the NRRC) utilize the NRRC because their respective programs do not utilize any of the lab space in NRRC.

- Move the material science curriculum into ME and rename the department Mechanical and Materials Engineering. Also move one faculty line from MME to ME. The MME department is too small to carry multiple focus areas and has consciously chosen to prioritize metallurgy over materials (see MME review). The ME faculty are highly engaged in the material science area. And, the ME department is large enough to foster multiple focus areas (mechanical and materials engineering).

*Net Change in Faculty from 2018-19*

One addition via moving a line from MME to ME.

DRAFT

## Metallurgy and Materials Engineering (MME) Department Degrees offered

- BS Metallurgical and Materials Engineering
- MS Metallurgical and Minerals Processing Engineering
- Participates in PhD in Material Science.

2018-19 faculty head count = 5.33 (Huang counted as 1/3).

### *Guideposts and Metrics*

- **Guidepost 1:** MME is designated as an S&E program.
- **Guidepost 3:** MME participates in research and has active graduate degrees.
- **Enrollment and Teaching:** MME has moderately low enrollment with a 3-year decline. Its service SCHs are moderately small. The program teaching SCHs are low (near 250 SCH per faculty) due to the low program enrollment.
- **Expenditures:** MME is very near the national average for expenditures.
- **Research:** ME C&G revenue is low compared to the C&G salaries because nearly all their recent research has been thru the ARL grant. They need to establish their own competitive research funding.

### *Overall observations*

MME struggles in honoring the breadth of their degree primarily because of low BS enrollment. They have two focus areas: extractive metallurgy/mineral processing versus materials. The department significantly struggles with balancing these two focus areas among the curriculum and faculty expertise. In large part, this struggle stems from their low enrollment and low faculty numbers. They do not have the faculty numbers or enrollment to justify robust offerings in both focus areas. They have consciously chosen to prioritize the metallurgy/minerals area over materials area

### *Initial Thoughts*

- Have the department focus on metallurgy/minerals only. Move the material science curriculum and one faculty line out of MME and into Mechanical Engineering and rename the department the Metallurgical Engineering Department. Several of the Mechanical Engineering faculty are highly engaged in the material science area, and the ME department is large enough to foster multiple focus areas (mechanical and materials engineering).
- Use adjuncts and graduate students to cover classes until Huang fully retires (he is 1/3 at this time). When he does fully retire, replace this position.

### *Net Change in Faculty from 2018-19*

Move one faculty line to Mechanical Engineering to follow an appropriate level of materials curriculum.

## Mining Engineering (MinE) Department

Degrees offered:

- BS Mining Engineering
- MS Mining Engineering.

2018-19 faculty head count = 5.

### *Guideposts and Metrics*

- **Guidepost 1:** Mining Engineering is designated as an S&E program.
- **Guidepost 3:** MinE is active in research. Its C&G funding is moderate and the MS enrollment is strong.
- **Enrollment and Teaching:** MinE has moderately low enrollment with a slight 3-year decline. Its service SCHs are strong with nearly all of it coming from teaching Engineering Econ. The program teaching SCHs are low (near 250 SCH per faculty) due to the low program enrollment.
- **Expenditures:** MinE expenditures are below the national metrics primarily from its service teaching.
- **Research:** MinE's C&G activity is relatively low. But, they have relatively strong MS enrollment.

### *Overall observations*

MinE is a strong department with a good focus in delivering an applied BS program. They have worked hard to establish a unique niche with the underground mine. They have strong potential to establish a professional graduate program via the M.Eng.

### *Initial Thoughts*

- No changes recommended.

### *Net Change in Faculty from 2018-19*

None.

## Petroleum Engineering (PetE) Department

Degrees offered:

- BS Petroleum Engineering
- MS Petroleum Engineering

2018-19 faculty head count = 9

### *Guideposts and Metrics*

- **Guidepost 1:** PetE Engineering is designated as an S&E program.
- **Guidepost 3:** PetE is active in research. Its C&G funding is moderate and the MS enrollment is relatively low.
- **Enrollment and Teaching:** PetE Fall 2018 enrollment is 192 FTE; down from 510 FTE in 2015/16. The current enrollment is relatively high; but, the decrease is very significant. PetE teaches very little service courses. Its program SCH taught follows the enrollment trend – high in 2015/16 with a significant decrease going forward.
- **Expenditures:** In FY17, PetE expenditures were below national averages. But, with the drop in enrollment, they are likely close to the national average today.
- **Research:** PetE is moderately low in research volume. The nature of the program and industry as well as the faculty make-up are not conducive to high research activity.

### *Overall observations*

The significant enrollment swing is not unexpected as is tied, for the most part, to the price of oil. In 3 years, the department has swung from over enrolled to under enrolled. The natural reaction is to reduce faculty lines. But, history has shown it is very difficult to hire qualified PetE faculty. Also, it is likely the enrollment will cycle back. The department likely runs best at a student-to-faculty ratio near 30/1, and fewer than 300 students. We must be cautious.

### *Initial Thoughts*

- Reduce the faculty by one position.
- In addition, have the PetE faculty teach the equivalent of one FTE outside of PetE. Options include math, physics, and mechanical engineering.

### *Net Change in Faculty from 2018-19*

A reduction of 1 faculty line.

## Safety Health & Industrial Hygiene (SHIH) Department

Degrees offered:

- BS Occupational Safety and Health
- BS Applied Health and Safety Sciences
- MS Industrial Hygiene
- MS Industrial Hygiene via Distance Learning

2018-19 faculty head count = 8.

### *Guideposts and Metrics*

- **Guidepost 1:** SHIH is not designated as an S&E program. But, the department faculty have strongly argued that they are not properly CIP-code classified by the Tech administration. They argue that they should be classified under the S&E CIP 15.701 (Occupational Safety and Health) instead of the non-S&E CIP 51.2206 (Occupational Health and Industrial Hygiene). Dean Trudnowski agrees with them for two reasons: 1) the strong focus of the programs in safety sciences; and 2) the fact that 3 of the 4 programs are ABET accredited.
- **Guidepost 3:** SHIH is active in research. Their online MS program is very heavily enrolled and the on-campus MS program has strong enrollment.
- **Enrollment and Teaching:** SHIH has strong enrollment and SCH delivery. They teach very little service courses. But, they are among the highest in program SCH taught per program faculty.
- **Expenditures:** SHIH is below the national comparators in expenditures.
- **Research:** SHIH has excellent graduate enrollment both for the on-campus thesis-based MS and the non-thesis online MS. Their C&G funding actively is relatively low.

### *Overall observations*

The SHIH department is very productive and does an excellent job in three of the four programs they deliver. The AHSS program is the one exception. This program is not accredited and lacks focus. It has little to no tie to the mission of the SME and its curriculum might match more with a pre-health program. Only one professor is dedicated to this program which is also a major concern. The AHSS has low enrollment; but, its enrollment is growing.

### *Initial Thoughts*

- Remove the AHSS program from the SHIH department and house it in the Biology department.
- Move the faculty member who teaches and advises the AHSS program into the Biology department.

### *Net Change in Faculty from 2018-19*

A reduction of 1 faculty line tied to the AHSS program.

## Biological Sciences Department

### Degrees Offered/Options

- BAS Biology
- BS Biological Sciences Organismal Track
- BS Biological Sciences Cellular/Molecular Track

**Head-count faculty AY18-19:** 8 FTE.

### *Guideposts and Metrics*

- **Guidepost 1:** Designated as an S&E program.
- **Guidepost 3:** Biology does not have a stand-alone graduate degree. The department does engage in graduate and undergraduate research. Faculty serve as the research director for students completing graduate degrees.
- **Enrollment and Teaching:** Review of the metrics indicates that Biology is a consistent, strong performer in the majority of categories in the upper 50% and never lower than 40%. Biology has demonstrated one of the strongest enrollment growths during the AY 15/16-AY 17/18 period (upper 15%). During the fall of 2018, the program added an additional 15 students.
- **Expenditures:** Biology has low relative instructional costs, being 5% above the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** Engaged in research at an appropriate level given program resources and staffing. Very successful in obtaining external support of work for a program with an undergraduate focus.

### *Overall Observations*

Biological Sciences is a strong department that has modest enrollment growth. This enrollment growth has occurred during a time of overall enrollment decline at Montana Tech. The department effectively and efficiently teach a large number of students in service courses and is an important contributor to the success of the Nursing program. The success of program faculty in obtaining external funding is notable.

### *Initial Thoughts*

- The program is encouraged to maximize the potential of the Restoration Certificate.
- Continued emphasis on undergraduate research is encouraged.
- Continue the partnership with chemistry to enhance the pre-professional program.
- Take over administration and curriculum of Applied Health and Safety Science to continue building robust pre-professional health program. (See SHIH in this document for further details.)

### *Net Change in Faculty*

Addition of Applied Health and Safety Science is an increase of 1 FTE (FTE move from SME): total program staffing of 9 FTE.

## Business Information and Technology Department

### Degrees Offered/Options

- BS Business and Information Technology, Accounting
- BS Business and Information Technology, Health Information Technology
- BS Business Information and Technology, Information Technology
- BS Business Information and Technology Management of Natural Resources
- BS Business Information and Technology, Management
- BS Business Information and Technology, Marketing
- BAS Business UM-Helena
- BAS Business, Accounting Track
- BAS Business Construction Management Track
- BAS Business Management Track

**Head-count faculty AY18-19:** 6 FTE (1 FTE of 6 FTE currently unfilled).

### Guideposts and Metrics

- **Guidepost 1:** Not designated as an S&E program.
- **Guidepost 3:** BIT does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** The program serves a very large numbers of students both in the program and in service courses. Program faculty teach high enrollment courses. Review of the metrics indicates that the business program is a strong performer in most categories. However, the program has experienced a significant enrollment decline during the AY 15/16-AY 17/18 periods (-147 students), with continued declines during the fall of 2018 (-13 students). This is contrary to national trends where demand for undergraduate business programs has remained strong.
- **Expenditures:** BIT has among the lowest relative instructional costs at Montana Tech, being - 34% below the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** N/A

### Overall Observations

The department is to be commended for their commitment to service and low program delivery costs when compared to peers.

The decline in enrollments of the business program track the overall decline in enrollments at Montana Tech. Although, the enrollment decline is understandable in this light, this is contrary to national trends where demand for undergraduate business programs has remained strong. The business program needs to stem enrollment declines and continue to be one of the more highly enrolled programs at Montana Tech.

### Initial Thoughts

- The Business program needs to take a careful look at its program offerings and structure. The program has too many degrees, options, etc. Multiple options in a program require departmental and institutional resources to offer and often have an adverse impact on overall

program quality. The department needs to review their current options and restructure the program to have a maximum of three options, preferably two. These changes will allow for a focus on quality and the potential to engage more students in undergraduate research.

- Given the history and mission of Montana Tech, program faculty are strongly encouraged to partner with additional programs to make the Natural Resources Management option one of the pillars of the department.
- Consider pursuing a more rigorous ACBSP Accreditation instead of IACBE.

#### *Net Change in Faculty*

The recommendation for staffing is to leave the 1 FTE unfilled (-1 FTE) pending the implementation of curricular changes and stabilization/increase of program enrollments (5 FTE total).

DRAFT

## Chemistry and Geochemistry Department

### Degrees Offered/Options

- BS Chemistry Biochemistry Option
- BS Chemistry Professional Option
- BS Chemistry Environmental Option
- MS Geochemistry (Geoscience)

**Head-count faculty AY18-19:** 7 FTE (3 FTE of the 7 FTE unfilled: 2 FTE are being advertised, with 1 FTE visiting).

### Guideposts and Metrics

- **Guidepost 1:** Designated as an S&E program.
- **Guidepost 3:** Chemistry has a graduate degree. The department does engage in graduate and undergraduate research. Faculty serve as the research director for students completing graduate degrees.
- **Enrollment and Teaching:** Review of the metrics indicates that chemistry stands out by the contributions that it makes to service teaching. In this role, the department contributes to the success of students in programs throughout Montana Tech in SME and CLSPS. Enrollment was flat during the 15/16-AY 17/18 period, with an additional 8 students in the fall of 2018. The Service Course SCH Taught per Effective FTE Service Course Faculty during 15/16-AY 17/18 period are in the upper 20% of programs at Montana Tech. The number of degrees granted in the program is in the bottom 20% of all programs at Tech. The FTE Enrollment per Effective FTE Program Faculty ratio is in the lower 25% of Montana Tech programs during the AY 15/16-AY 17/18 period.

Chemistry had nearly flat enrollment during the AY 15/16-AY 17/18 period. During the fall of 2018 there were 28 majors, an increase of 6 students.

- **Expenditures:** Chemistry has high relative instructional costs, being 16% above the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** Engaged in research at an appropriate level given program resources and staffing. Successful in obtaining external support of work.

### Overall Observations

The chemistry department has all of the elements in place to have enrollment growth. With enrollment growth program delivery costs will be reduced. Chemistry is an essential provider of service course offerings at Montana Tech.

*Initial Thoughts*

- The department is encouraged to build upon the strong foundation of faculty scholarship and research. Undergraduate research presents a particularly promising area of focus.
- Continue the partnership with Biological Sciences to enhance the pre-professional program.
- Continue to enhance the Environmental Track through partnerships and collaborations.

*Net Change in Faculty*

Reduce by one FTE.

DRAFT

## Computer Science/Software Engineering Department

### Degrees Offered/Options

BS Computer Science Business Applications  
 BS Computer Science Electronic Control Systems  
 BS Computer Science Engineering Applications  
 BS Computer Science Statistical Applications  
 BS Computer Science Technical Communications  
 BS Computer Science Health Care Informatics  
 BS Computer Science Game Development  
 BS Software Engineering Business Applications  
 BS Software Engineering Electronic Control Systems  
 BS Software Engineering Applications  
 BS Software Engineering Statistical Applications  
 BS Software Engineering Technical Communications  
 BS Software Engineering Health Care Informatics  
 BS Software Engineering Game Development

**Head-count faculty AY18-19:** 5 FTE

### Guideposts and Metrics

- **Guidepost 1:** Designated as an S&E program.
- **Guidepost 2:** CS/SE does not have a stand-alone graduate degree. The department does engage in undergraduate research.
- **Headcount:** AY 18-19: 5 FTE (1.0 FTE unfilled from previous year).
- **Enrollment and Teaching:** The CS/SE program, with 70 majors as of fall 2018, indicates that it plays an important role at Montana Tech (11 out of 23 programs at Montana Tech). During the 15/16-AY 17/18 period enrollment in CS/SE suffered a slight decline. Recent data indicates that there appears to be an increase in student enrollment in the Computer Science BS (45 total students fall 2018) and a decline in the Software Engineering BS (25 total students fall 2018). During the 15/16-AY 17/18 periods, CS/SE has enrolled ~35 first-time freshmen.

CS/SE shares 50% of the administrative, instructional, and advising of the DS degree. This arrangement results in an additional 3.5 FTE of students that should be credited to CS/SE.

The metrics indicate that CS/SE does not stand out as a service oriented department or one that has high efficiency at teaching students in the program (*e.g.* relatively low numbers of SCH Taught per Effective FTE Program Faculty). The department is in the lower 50% of total degrees awarded during the 15/16-AY 17/18 period.

- **Expenditures:** CS/SE has the highest relative instructional costs at Montana Tech, being 84% above the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** Engaged in research at an appropriate level given program resources and staffing. Successful in obtaining external support of work.

### *Overall Observations*

Given national trends in CS/SE, one would predict that this program would be experiencing robust enrollment growth. The reasons for the lack of enrollment growth in the program are likely due to a number of factors that are beyond the control of the program faculty. However, the program faculty do control the curriculum, and it is in this area where changes need to be considered. Growing a program through creating additional options and degrees does not work; the result of such an approach is not appealing to students, increases complexity, and requires the allocation of additional resources.

The department lacks a strong connection to the engineering programs at Tech. The engineering companies do not heavily recruit CS majors and the department has no major fiscal connections to industry (e.g., major gifts and/or endowments). Tech's engineering programs would benefit from better curricular content related to computing and computer science.

### *Initial Thoughts*

- Move the CS/SE program to SME. This would leverage the connections between CS/SE and programs/field in SME that are connected with CS.
- Two FTE that are currently in the DS program would become associated with the CS/SE department. These faculty lead the effort to develop a Data Science concentration or option within CS/SE.
- The CS/SE program has two BS degrees and each of these degrees have seven options (they are the same seven options for both degrees). Given the number of faculty in the department and the declining interest of students in the Software Engineering BS, the department needs to consider offering a single BS degree. This single degree could continue to have some options, but those need to be carefully considered to be targeted at the degrees in SME and CLSPS that have robust enrollments. Additionally, these options should require only those courses that are regularly taught as part of the other program curriculum.

### *Net Change in Faculty*

The recommendation for staffing is to leave the 1 FTE CS/SE unfilled pending the implementation of curricular changes and stabilization/increase of program enrollments (-1 CS FTE). Two FTE currently assigned to DS will be assigned to CS/SE resulting in 6 FTE in the program, with two specializing in Data Science/Statistics.

## Data Science and Statistics Department

### Degrees Offered/Options

- BS Data Science
- BS Statistics

**Head-count faculty AY18-19:** 3 FTE.

#### *Guideposts and Metrics*

- **Guidepost 1:** Designated as an S&E program.
- **Guidepost 3:** CS/SE does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** Metrics indicate that DS/Stat does not have significant enrollments in either DS or Statistics. There is currently one student with a declared major in Statistics, a sophomore. There have been fewer than 3 freshman students per year entering the program majors during the AY 15/16-AY 17/18 period with three fall of 2018. Data science currently has seven students (half of these students counted as FTE for CS/SE). These low enrollments place Stat/DS near the bottom of average program enrolments at Montana Tech during the AY 15/16-AY 17/18 periods with only MPEM being lower. Stat/DS has the lowest average number of degrees awarded at Montana Tech during the AY 15/16-AY 17/18 period.

The Data Science and Statistics faculty teach a number of courses that provide a service to other programs on campus. This service load places the program in the middle of the pack (upper 50%) with about 2 of the 4 Effective FTE faculty teaching the service courses.

Enrollment in Stat/DS has been increasing since program inception in the spring of 2017 to its current seven students, with all of the growth occurring in the Data Science program. Very low enrollment in a program will necessarily result in very low faculty-to-student ratios; Stats/DS has the lowest of Program SCH Taught per Effective FTE Program Faculty for AY 15/16-AY 17/18 for all programs presented in the data.

CS/SE shares 50% of the administrative, instructional, and advising of the DS degree. This arrangement results in an additional 3.5 FTE of students that should be credited to CS/SE. (This is a reduction of 3.5 student FTE for the Stats/DS program.)

- **Expenditures:** Stats/DS has very high relative instructional costs, being 50% above the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** N/A

### *Overall Observations*

The data presents a picture of a program that has low enrollment, has high delivery costs, and provides a modest amount of service. The DS program is a very new degree (major added to catalog Spring 2017), which could explain the low enrollment. In order for the program to become viable, it needs to be growing at a rate much greater than has been demonstrated to date. Given that the metrics point to this program not standing out in any particular area (enrollment, service, efficient delivery, research active, etc.), it becomes difficult to make the case for preservation as a stand-alone degree program.

### *Initial Thoughts*

- The Statistics and Data Science program should be eliminated. Program faculty continue to teach required/needed statistics service courses.
- The DS degree is currently a joint degree between CS/SE and DS/Stat. Two FTE currently in the program should be moved to CS/SE to support DS at Montana Tech. The DS degree should become a concentration/option in CS/SE.
- One FTE currently assigned to the program should be moved to the Mathematical Sciences Department. This faculty member could teach both mathematics and statistics.

### *Net Change in Faculty*

No net reduction in faculty FTE; however, all faculty associated with this program are assigned to other departments (see above section).

## Healthcare Informatics Department

### Degrees Offered/Options

- BS, AS, Graduate Certificate Healthcare Informatics
- CT Certificate Healthcare Informatics

### Head-count faculty AY18-19: 3 FTE

#### *Guideposts and Metrics*

- **Guidepost 1:** Not designated as an S&E program.
- **Guidepost 3:** HCI does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** HCI has had a significant decline in program FTE during the past three years. In the fall of 2018, HCI had 19 students enrolled in the BS degree. This is a decline of six students from the previous year. There are currently no students enrolled in CT certification program. Program SCH is among the most significant percentage declines of all programs during the AY 15/16-AY 17/18 period. Fewer than three first-time freshman entered the program during the AY 15/16-AY 17/18 period.

HCI does not have a large service teaching component, residing at 35% of all programs in this category. The Service Course SCH taught per Effective Service Course Faculty during the AY 15/16-AY 17/18 period is in the bottom 30% of programs at Montana Tech.

- **Expenditures:** HCI has high relative instructional costs, being 16% above the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** N/A

#### *Overall Observations*

The Healthcare Informatics program is well aligned with institutional mission. This is a program that is targeted to a national workforce need. The program is focused and of high quality. With its online focus, has the potential to reach beyond Montana to recruit students.

Healthcare Informatics is one of those programs that has all the ingredients for success; however, the program has not been able to recruit students to create a sustainable program. The largest barrier to success might be that the program is not fully online (~80%). Making the program fully online is difficult given that it is the courses that are not controlled by HCI faculty that need to be taught online (*e.g.* Computer Science). Unless Montana Tech makes significant commitments to the development and support of online courses in areas such as CS, it is unlikely that HCI will move to being fully online.

In most of the data categories presented as part of the program prioritization process, with few exceptions, HCI is in the bottom lower third of all BS programs at Montana Tech. Arguably, there is demand for graduates of this type of program, but this demand is not translating to students coming to Montana Tech for this degree. Enrollment trends tell the story of a degree that has been met with declining interest over time.

*Initial Thoughts*

- The recommendation is to eliminate the HCI program.

*Net Change in Faculty*

-3 FTE

DRAFT

## Liberal Studies Department

### Degrees Offered/Options

- BS Interdisciplinary Arts and Sciences
- BAS General Science

### Head-count faculty AY18-19: 8 FTE

#### *Guideposts and Metrics*

- **Guidepost 1:** Not designated as an S&E program.
- **Guidepost 3:** IAS does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** The metrics indicate that the primary focus of IAS faculty is instruction in General Education/Service courses. The department is second only to mathematics in the total number of service course SCH. The number of SCH in service courses has declined by (~25%) during the AY 15/16-AY 17/18 period. IAS is a new major (2018) that currently has 12 students. The Liberal Studies degree being taught out, currently has 17 students. The Liberal Studies major saw enrollment declines over the AY 15/16-AY 17/18 period.
- **Expenditures:** IAS has low relative instructional costs, being -5% below the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** N/A

#### *Overall Observations*

If the only consideration for continuation of the IAS degree were program cost and enrollment, the recommendation would likely be for elimination of the degree, while retaining program faculty to teach service courses. However, IAS is a critical degree option for those students at Tech who do not want to pursue a STEM degree. Toward this end, the program is structured for students to choose the IAS degree when they switch majors late in their academic careers. There is a possibility that the elimination of other programs through the PP process, particularly those that are not designated a S&E, will lead to increased enrollments in students pursuing an IAS degree.

The service function of the IAS department will continue to be a high priority of the program and Montana Tech. Program elimination in other areas will likely increase the number of students that need service courses provided by IAS faculty.

#### *Initial Thoughts*

- Given the anticipated changes to programs that are closely allied to IAS, the program will need to carefully review their degree offering(s). This review might provide an opportunity to explore a more focused plan of study in the degree. The program may also need to consider developing courses that address important, appropriate learning outcomes that were lost due to changes in other programs.

- Anticipating that IAS will be impacted by program eliminations/reductions in other areas of Montana Tech, and overall enrollment next year at Montana Tech, it is difficult to accurately predict program faculty needs. Between the 2016-2017 and 2017-2018 AY the program moved from 9 to 8 faculty FTE.
- Close coordination of the LS department and Highlands College has the potential to grow the BAS General Studies degree.
- When it makes pedagogical sense for IAS faculty to teach courses in the Writing program, they should be utilized for that purpose.
- LS should assume administration, scheduling, and oversight of HYPER, Choir, band, etc.

*Net Change in Faculty*

+2 FTE from PTC.

## Mathematical Sciences Department

### Degrees Offered/Options

- BS Mathematical Sciences
- BS Mathematical Sciences, Applied Option

### Head-count faculty AY18-19: 7 FTE

#### *Guideposts and Metrics*

- **Guidepost 1:** Designated as an S&E program.
- **Guidepost 3:** Mathematical Sciences does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** Review of the metrics indicates that math stands out by the contributions that it makes to teaching service courses. The number of service course SCH has declined significantly (~25%) during the AY 15/16-AY 17/18 period. Math has a small number of majors, with modest enrollment growth over the most recent two years. The FTE Enrollment per Effective FTE Program Faculty ratio is in the lower 25% of all programs during the AY 15/16-AY 17/18 periods.
- **Expenditures:** Math has very low relative instructional costs, being -13% below the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** N/A

#### *Overall Observations*

The knowledge and skills that are taught by program faculty in their subject areas are of high value to students enrolled in a wide variety of science, technology, and engineering programs at Montana Tech. The program does an excellent job in supporting students that arrive at Montana Tech who are underprepared in mathematics. The department has had success in working with providing math instruction to students at Highlands College. The faculty do engage in scholarship.

Mathematical Sciences is an essential program at Montana Tech that is critical to the success of students in every program. The program appears to be poised for a modest increase in majors.

#### *Initial Thoughts*

- Program needs to consider offering a single, applied mathematics degree. Such a degree fits with Montana Tech's mission, best meets our student needs, and provides a clear program focus. Within that major, there could be Focus Group(s) to address high need areas; however, these would also need to be through an applied mathematics lens.
- The mathematics department should assume all administrative and instructional responsibilities of the Highlands program.
- One FTE from Data Science and Statistics is moved to Mathematical Sciences department.
- Consider having qualified faculty on campus teach math courses.

*Net Change in Faculty*

No change (7 FTE) with the inclusion of the 1 FTE from Statistics/Data Science.

DRAFT

## Networking Technology Department

### Degrees Offered/Options

BS Network Technology/Options

**Head-count faculty AY18-19:** 1 FTE

### *Guideposts and Metrics*

- **Guidepost 1:** Designated as and S&E program.
- **Guidepost 3:** Network Technology does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** Review of the metrics indicates that the program has had flat enrollment during the AY 15/16-AY 17/18 period with an average of 41 students. Student credit hours have not had a significant decline over the same AY 15/16-AY 17/18 period. This program is linked with the two-year degree program at Highlands College. The most recent number of students graduating with the BS degree is five.
- **Expenditures:** Network Technology has low instructional costs being at the average of the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** N/A

### *Overall Observations*

This degree is the result of a collaborative effort between Highlands College and the North Campus of Montana Tech; student enrolled in the program start at Highlands College enrolled in the same courses that students pursuing the two-year Network Technology degree at Highlands. The four-year degree is delivered on the Highlands College campus. The program faculty are collaborative and make the entire program, both the two and four-year, work for students.

### *Initial Thoughts*

Highlands College has proposed some name changes and restructuring of program administration. These change should be enacted to provide more program focus and appeal for the degree. The inclusion of cybersecurity is a high priority.

### *Net Change in Faculty*

None

## Nursing Department

### Degrees Offered/Options

- BS Nursing, Pre-Licensure
- BS Nursing, Post-Licensure Completion

**Head-count faculty AY18-19:** 11 FTE

### *Guideposts and Metrics*

- **Guidepost 1:** Not designated as an S&E program.
- **Guidepost 3:** Nursing does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** The nursing program has the third-highest FTE enrollment of all programs at Montana Tech: average of 179 FTE during the AY 15/16-AY 17/18 period. In the fall of 2018 there were 218 FTE enrolled in the Nursing and Pre-Nursing programs. Review of the data indicates that the Nursing program ranks among the lowest of Program SCH Taught per Effective FTE Program Faculty for the AY 15/16-AY 17/18 period. Due to limitations in facilities and staffing, the Nursing program is currently at maximum instructional capacity in the Pre-Licensure degree.
- **Expenditures:** Nursing has high relative instructional costs, being 13% above the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** N/A

### *Overall Observations*

Nursing is well aligned to university mission. It is a tightly managed, high quality, focused degree program that has had large enrollment growth during the AY 15/16-AY 17/18 period. If additional resources were available (space, equipment and personnel) it is likely that further program growth of the residential program could be sustained. Fall 2018 Enrollments in the post-licensure program were disappointing.

### *Initial Thoughts*

- Focus on strategies to grow enrollments in the Post-Licensure program. Over the short-term, this is the area where additional enrollment can be supported.
- Consider an accelerated track in the Post-Licensure program.
- Explore the possibility of in-residence program delivery in Missoula through a partnership with the University of Montana.
- Explore ways in which to reduce the cost of program delivery. In many instances, it is understood that the faculty-student ratios are defined for many elements of program delivery; however, the program is encouraged to find those areas where class size can be increased without sacrificing program quality.

### *Net change in Staffing*

No change (maintain current staffing at 11 FTE).

## Professional and Technical Communication Department

### Degrees Offered

- BS Professional and Technical Communication
- BS Professional and Technical Communication, Health and Science Communication
- BS Professional and Technical Communication, Interactive Media
- BS Professional and Technical Communication, Public Relations
- Post-Baccalaureate Certificate Practice of Technical Communication
- MS Technical Communication

**Head-count faculty AY18-19:** 4 FTE

### Guideposts and Metrics

- **Guidepost 1:** Not designated as an S&E program.
- **Guidepost 3:** PTC does have a graduate degree: MS in Technical Communication (thesis and non-thesis). The department does not engage in significant amounts of research that engages graduate or undergraduate students. Faculty serve as the research director for students completing graduate degrees.
- **Enrollment and Teaching:** PTC is not in the top 25% of any metric category and is in the bottom 30% for several. There are currently 20 FTE in BS programs and 8 FTE enrolled in the MS. These numbers have not significantly changed over the past four years. There are 4.0 FTE faculty in PTC. The number of students in degree programs, although low, are comparable with a number of other programs at Montana Tech. During the AY 15/16-AY 17/18 period, three first-time freshman entered the program. Fall of 2018 two additional first-time freshman entered the program.
- **Expenditures:** PTC has very high relative instructional costs, being 79% above the Delaware peer group when comparing Expenditures Above National (SCH basis).
- **Research:** The department does not engage in research that obtains external funding.

### Overall Observations

The program provides a good option for students who are seeking a degree that is an alternative to a purely STEM degree. Alternative degree options such as PTC allows for students to remain at Montana Tech to complete their studies rather than having to transfer elsewhere and serves to attract a small number of students who are interested in the degree from the outset. Additionally, the program does offer courses that have the potential to contribute to the success of Montana Tech graduates in their career fields. The program attracts very few first-time freshmen. The MS degree attracts a moderate number of students, but lacks focus and does not generate significant external funding.

The data indicates that the cost of program delivery is one of the highest of all programs on campus. Contributing to this is that there are four faculty with a relatively small number (20 FTE) of students enrolled in the major.

*Initial Thoughts*

- Elimination of the PTC program and all PTC degrees.
- Two faculty FTE associated with the program are retained with those lines moved to Liberal Studies.
- Development of a communication option in Liberal Studies (an IAS degree option).

*Net Change in Staffing*

-2 FTE

DRAFT

## Writing Department

### Degrees Offered

- N/A

**Head-count faculty AY18-19:** 4 FTE (2 FTE of the 4 FTE Visiting Professors)

### Guideposts and Metrics

- **Guidepost 1:** Not designated as an S&E program.
- **Guidepost 3:** Writing does not have a stand-alone graduate degree. The department does not engage in significant amounts of research that engages graduate or undergraduate students.
- **Enrollment and Teaching:** Given that Writing is not a degree program, much of the data presented as part of the PP process does not apply. Writing is in the lower 50% of programs with Service Course SCH taught per Effective FTE for Service Course Faculty.
- **Expenditures:** Writing has low relative instructional costs, being -5% below the Delaware peer group when comparing Expenditures above National (SCH basis).
- **Research:** N/A

### Overall Observations

The Writing Department is an essential service department that is responsible for the oversight and instruction in all writing courses at Montana Tech. This includes the coordination and scheduling of writing course offerings at Highlands College. It is a high quality program that is focused on student success.

The relatively low ratio of Service Course SCH Taught per Effective FTE for Service Course Faculty is probably due to relatively low enrollment caps on writing courses. This probably is not of major concern given that the program has a lower cost of program delivery when compared to Delaware peers.

### Initial Thoughts

- The Writing Program becomes responsible for the over-all coordination and delivery for writing at Highlands College.
- Do not merge Writing with IAS at this time. This could be considered at a later date, but if the Writing Program takes over the program at Highlands College, this needs to be the initial focus of the Writing Program director and faculty.
- Eliminate all Writing FTE from Highlands College. Add 1 FTE to the North Campus to deliver the program at Highlands.
- Convert the current 2 FTE Visiting Writing Instructor positions to non-tenure permanent Instructor status. This will ensure program stability and quality.
- Total program FTE 5 with addition of Highlands faculty line.

### Net Change in Staffing

+1 FTE with the addition of the Highlands faculty line (no net change overall between Highlands and North Campus).

## Program: Business Technology (BUS)

### Credentials Awarded:

- CAS Office Assistant
- CAS Medical Receptionist
- AAS Business Technology – Medical Specialist Option
- AAS Business Technology – Administrative Computer Specialist option

Faculty Headcount: 1

### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program  
Does not draw students from out-of-state  
Not designated as an O\*NET STEM program
- **Guidepost 4:** Program aligned with north campus degree
- **Enrollment:** Declining enrollment in Business Technology over the past 3 years with Fall 2018 enrollment down almost 50% from Fall 2015. (from 19-10).

### *Overall Observations*

Neither option is producing a large number of graduates. Curriculum is not well aligned to current workforce needs, but faculty has been working with industry to strengthen their advisory board. Need to review CIP/SOC Crosswalks to improve alignment to industry needs.

### *Initial Thoughts*

- Recommendation is to eliminate the business/writing instructor position and have the writing department coordinate and teach the writing classes at Highlands
  - This would result in a reduction of one-third FTE
- Consider evenings and/or 8-10 week accelerated semester for low enrollment classes
- Utilize business faculty in providing non-credit/credit regional workforce training workshops to area businesses
- Develop/coordinate online business classes for short term credentials
- Eliminate/merge classes for cost savings
  - Eliminate keyboarding courses free up 6 credits per year
- Explore opportunities for dual credit classes and high school partnerships leading to business technology
- Re-evaluate program in two years due to low enrollment

### *Net Change in Faculty*

- 0.33 FTE (Currently one-third contract due to retirement)

- The writing department (CLSPS) will be responsible for the over-all coordination and delivery for writing at Highlands College

## Program: Accounting (ACTG)

### Credentials Awarded:

- CAS Bookkeeping
- AAS Accounting Technology – Health Service Option
- AAS Accounting Technology – Human Resources Option

Faculty Headcount: 1

### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program  
Does not draw students from out-of-state  
Not designated as an O\*NET STEM program
- **Guidepost 4:** Program aligned with north campus degree
- **Enrollment:** Fall 18 enrollment 22; down from 31 in Fall 15.

### *Overall Observations*

Combine the two options to have a larger enrollment than the Business Technology program. The combined SCH generation for the Business and Accounting programs remains well under the 16:1 ratio, however. Need CIP-SOC Crosswalks for Gainful Employment.

### *Initial Thoughts*

- Eliminate or merge low enrollment options in accounting
- Consider evenings and/or 8-10 week accelerated semester for low enrollment classes
- Utilize accounting faculty in providing non-credit/credit regional workforce training workshops to area businesses
- Develop/coordinate online accounting classes for short term credentials
- Explore opportunities for dual credit classes and high school partnerships leading to civil engineering technology
- Eliminate/merge classes - examples for cost savings
  - Eliminate records management course (students would take Access which is already offered)
- Explore opportunities for dual credit classes and high school partnerships leading to accounting technology

### *Net Change in Faculty*

No change in faculty

## Program: Network Technology (NETW)

### Credentials Awarded:

- AAS Web Development
- AAS Network Technology

Faculty Headcount: 2

### *Guideposts and Metrics*

- **Guidepost 2:** Matriculates to an S&E 4-year program
  - Ability to draw students from out-of-state
  - Designated as a O\*NET STEM program
- **Guidepost 4:** Program aligned with north campus degree
- **Enrollment:** Enrollment in the Network Technology programs has remained steady, hovering between 41-42 FTE students per year.

### *Overall Observations*

While enrollments have remained steady, the program struggles to retain students to second year. However, program expenditures are comparable to those included in the Delaware study. Credit hours generated through service courses is limited, but with a small faculty this is not unexpected.

### *Initial Thoughts*

- Due to the name change (Computer Networks and Cybersecurity) in the associate degree program students will see the value in requesting a reverse transcript and receive their associate's when they graduate with their bachelor's degree, since there is no additional cost to the student at the time of graduation
- Explore options for short term credentials and workforce development training
- Look into potential opportunities to become a testing center for different IT credentials
- Develop 6-9 credit Cybersecurity certificate for Electrical Engineering Students
- Explore opportunities for dual credit classes and high school partnerships leading to network technology

### *Net Change in Faculty*

No change in faculty

Program: Nursing Assistant (CNA)

Credential Awarded:

CTS Certified Nursing Assistant

Faculty Headcount: 1

#### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program  
Does not draw student from out-of-state  
Not designated as a O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree
- **Enrollment:** This is difficult to measure because most students enroll either into the Medical Assistant program or under the AS program, depending upon their career goal.

#### *Overall Observations*

The CNA program struggles for many reasons. First, as a program it is not Financial Aid eligible, so our workarounds obscure the student intent. Second, there are many competitors on the market who deliver the program on-demand and in a shorter time period, which meets industry demand. Students employed in nursing homes and other medical settings can take this program free through their employer. Third, the last iteration of the TAACCCT grant helped develop apprenticeship models for the CNA program, so Montana Department of Labor and Industry and the Area Health Education Centers administer these programs. These programs are cheaper than our CNA program because they have fewer college-level courses attached to them, and many of them are covered by state workforce development grants, making them completely free of charge to most students.

#### *Initial Thoughts*

- Recommendation is to eliminate the CNA program and partner with area High Schools and Adult Basic Education programs to help students earn the credential
- Utilize faculty to teach and coordinate non-credit/credit health classes
- Move forward on implementation of LPN program to meet the needs of the community and to recapture BSN students not accepted/failed BSN program
- Utilize faculty member to be a healthcare industry liaison, building partnerships with organizations and institutions that deliver healthcare throughout the region
- Develop stackable credentials for working adults wanting to go into the healthcare field

#### *Net Change in Faculty*

No change in faculty due to CNA faculty will teach non-credit/credit health classes

Program: Medical Assistant (AHMA)

Credentials Awarded:

AAS Medical Assistant

Faculty Headcount: 1

#### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program  
Does not draw students from out-of-state  
Not designated as an O\*NET STEM program (Health Occupations are considered a science related second domain by Department of Labor - Bureau of Labor Statistics)
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** Declining over the past 4 years, from 29 in Fall 2015 to 16 in Fall 2018.

#### *Overall Observations*

Retention is a significant problem for the program at 33% remaining in the program from year 1 to year 2 over the past 3 years. This is another program that will be facing competition from the Montana Department of Labor and Industry Apprenticeships in the future. That said, with an annual growth rate in demand of 2.36%, there will be ample opportunities for students in this field.

#### *Initial Thoughts*

- Build 2+2 program with Biology Department to assist students interested in PA or Medicine
- Develop an optional pathway for MA students to obtain a Certificate of Applied Science (CAS) to compete with Gallatin College and Flathead Valley Community College's shorter MA CAS programs
- Reduce credits in MA AAS program by 9 credits to shorten graduation timeframe for students and reduce expense of program to college students
- Explore opportunities for dual credit classes and high school partnerships leading to medical assistant

#### *Net Change in Faculty*

No change in faculty

Program: Radiologic Technology / Pre-Radiologic Technology (RADT) (PRAD)

Credentials Awarded:

AAS Radiologic Technology

Faculty Headcount: 1

#### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program  
Does not draw students from out-of-state  
Designated as an O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** Pre-Rad Tech enrollment remains strong, with enrollments in the low 40s. Rad Technology holds at about 10 students per year in enrollment

#### *Overall Observations*

Strong program numbers, with good retention rates makes this a strong program. Projected growth for Rad Techs in the state is good, with average wages in the mid-\$50s indicate that the demand will continue. There may be some competition from the apprenticeships offered by Montana Labor and Industry to keep an eye on, but overall the outlook on this program is strong.

#### *Initial Thoughts*

- Develop an optional distance education program to meet the needs of non-area students and to safely increase enrollment without burdening local healthcare facilities
- Establish lab/clinical sites to meet the needs of non-area students in Great Falls and Helena
- Explore opportunities for dual credit classes and high school partnerships leading to radiologic technology

#### *Net Change in Faculty*

No change in faculty

## New Program: Behavioral Health Technician (BHT)

### Credentials Awarded:

CTS Behavioral Health Technician

Faculty Headcount: 0 (The same faculty member teaches this program as well as the Medical Assistant)

### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program  
Does not draw students from out-of-state  
Not designated as an O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree
- **Enrollment:** This is a new program that is not fully underway yet. It enrolled 4 students this fall, which was the first year it was available.

### *Overall Observations*

This is not a financial aid eligible program, which will hinder its growth without a solid marketing strategy. This also means that the most likely participants will be working adults, which may require different marketing strategies for growth as well as different delivery mechanisms (evenings, online, accelerated, etc.).

### *Initial Thoughts*

- New Program Fall 2018
- Explore the possibility of embedding the CTS BHT in degree programs (which would make it financial-aid eligible for students pursuing those degrees)
- Deliver as both a credit and non-credit option
- Explore opportunities for dual credit classes and high school partnerships leading to CTS Behavioral Health Technician
- Re-evaluate program in two years due to low enrollment

### *Net Change in Faculty*

No change in faculty (The same faculty member teaches the BHT and Medical Assistant programs)

Program: Metals Fabrication (MFAB)

Credentials Awarded:

AAS Metals Fabrication Technology  
CAS Machining  
CAS Welding

Faculty Headcount: 2

*Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program (Potential)  
Does not draw students from out-of-state  
Not designated as an O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** Over the past three years, enrollment has grown to 32 students this year.

*Initial Thoughts*

- Consider breaking apart the current trades department structure into two separate departments
- Host summer workshops
- Work with industry regarding scholarships
- Work with Mechanical and Civil Engineering Departments on collaboration
- Explore opportunities for dual credit classes and high school partnerships leading to metals fabrication technology

*Net Change in Faculty*

No change in faculty

## New Program: Precision Machining (MCH)

### Credentials Awarded

AAS Precision Machining Technology

Faculty Headcount: 0 (one faculty member in this area is counted in the MFAB program.)

### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program (Potential)  
Does not draw students from out-of-state  
Not designated as an ONet STEM program
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** Current enrollment is 23.

### *Initial Thoughts*

- New Program Fall 2018
- Consider breaking apart the current trades department structure into two separate departments
- Host summer workshops
- Work with industry regarding scholarships
- Work with Mechanical and Civil Engineering Departments on collaboration
- Explore opportunities for dual credit classes and high school partnerships leading to precision machining technology

### *Net Change in Faculty*

No change in faculty

Program: Automotive (AUTO)

Credentials Awarded:

AAS Automotive Technology

Faculty Headcount: 2

#### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program (Potential)  
Does not draw students from out-of-state (Potential)  
Designated as an O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** Transitioning the program from a certificate to an Associate's degree initially increased enrollment, but this year enrollment dropped to 6 students.

#### *Overall observations*

There is room to grow this program with the right marketing and industry partnerships. Strong occupational outlook with decent wages makes this a potentially strong program if we can partner with local dealerships and auto repair shops.

#### *Initial Thoughts*

- Consider breaking apart the current trades department structure into two separate departments
- Consider evenings and/or 8-10 week accelerated semester for low enrollment classes
- Develop a career pathways model that incorporates stackable credentials
- Pursue NIASE certification, Snap-on Credentials
- Develop Diesel Mechanic and Hybrid Technology certificates
- Pursue partnerships with Helena College and Missoula College to deliver Automotive programs at those colleges
- Host summer workshops
- Work with industry regarding scholarships
- Work with Mechanical Department on collaboration
- Explore opportunities for dual credit classes and high school partnerships leading to automotive technology
- Re-evaluate program in two years due to low enrollment

#### *Net Change in Faculty*

No change in faculty

Program: Construction (CNST)

Degrees Awarded:

AAS Construction Technology- Carpentry  
CAS Carpentry

Faculty Headcount: 1

#### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program (Potential)  
Does not draw students from out-of-state  
Not designated as an O\*NET STEM program
- **Guidepost 4:** Program aligned with north campus degree
- **Enrollment:** Enrollment has grown over the past two years, to 25 students currently enrolled.

#### *Overall Observations*

Construction is one of those careers that competes with both employers who need laborers on site, as well as the apprenticeship models that are used widely throughout the state. Aligning our programs to those apprenticeships will allow them to continue to grow, and increasingly colleges are becoming the owners of apprenticeship programs, which is a model that could work for Highlands moving forward.

#### *Initial Thoughts*

- Consider breaking apart the current trades department structure into two separate departments
- Host summer workshops
- Work with industry regarding scholarships
- Work with Mechanical and Civil Engineering Departments on collaboration
- Continue to pursue pre-apprenticeship opportunities throughout the state
- Explore opportunities for dual credit classes and high school partnerships leading to construction technology

#### *Net Change in Faculty*

No change in faculty

Program: Drafting (DRFT)

Credentials Awarded:

AAS Drafting Technology  
CAS Drafting

Faculty Headcount: 1

*Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program (Potential)  
Does not draw students from out-of-state  
Designated as an O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** The number of students enrolled in this program remains low, although enrollment in individual courses is much higher due to cross listing of courses between programs.

*Overall Observations*

While this program is indeed small, the courses fill because they provide courses to other programs. 60% of the credit hours generated in this program are “service” courses that enroll other students. Employment for Architectural and Civil Drafters remains high in the state as well as locally, and demand for these skills will grow over the next 10 years, making this a marketable program. Two other colleges in the state have Drafting Technology.

*Initial Thoughts*

- Consider breaking apart the current trades department structure into two separate departments
- Consider program name change (example - Design Drafting Technology)
- Consider evenings and/or 8-10 week accelerated semester for low enrollment classes
- Host summer workshops
- Work with industry regarding scholarships
- Work with Mechanical and Civil Engineering Departments on collaboration
- Consolidate Blueprint class students (construction, machining, and drafting all provide a blueprint class to their students) and have Drafting teach one class for trades
- Re-evaluate program in two years due to low enrollment

*Net Change in Faculty*

No change in faculty

## Program: Civil Engineering Technology (CET)

### Credentials Awarded:

- CTS Land Surveying
- AAS Civil Engineering Technology

Faculty Headcount: 1

### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program (Potential)  
Does not draw students from out-of-state  
Designated as an O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** Enrollment was beginning to grow a few years ago, but enrollment dropped in AY17 and AY 18.

### *Overall Observations*

Some of the enrollment drop is correlated to the timing of a faculty sabbatical. The job market remains viable for students in this program, particularly with only one other college in Montana offering this program.

### *Initial Thoughts*

- Consider breaking apart the current trades department structure into two separate departments
- Consider evenings and/or 8-10 week accelerated semester for low enrollment classes
- Consider merging the program with Drafting
- Work with Civil Engineering Department on collaboration
- Explore opportunities for dual credit classes and high school partnerships leading to civil engineering technology
- Re-evaluate program in two years due to low enrollment

### *Net Change in Faculty*

No change in faculty

Program: Line Program (LINE)

*Certificates Awarded*

CAS Pre-Apprentice Lineman

Faculty Headcount: 1 (with one open position that is unfilled)

*Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program (Potential)  
Draws students from out-of-state  
Not designated as an O\*NET STEM program
- **Guidepost 4:** Program not aligned with north campus degree (Potential)
- **Enrollment:** Holds steady at around 20-25 students.

*Overall Observations*

While this is a signature program, we struggle to keep instructors in the program. The pay for linemen is much higher than salaries to teach at Highlands. Northwestern Energy has recently reenacted an Industry Advisory Board to discuss the structure of the program as well as our staffing needs, in an attempt to help us recruit and retain qualified instructors at the salaries higher education pays. That said, the demand for lineman both in Montana and around the country remains strong, and there are likely opportunities to grow the program if we can solve the instructor issue.

*Initial Thoughts*

- Consider breaking apart the current trades department structure into two separate departments
- Revitalize Industrial Advisory Board
- Work with Foundation and industry to offset instructor salaries
- Develop two 8-week plan of study schedules to replace one 15-week schedule to assist with financial aid opportunities
- Offer program continuously throughout the academic year including summer

*Net Change in Faculty*

No change in faculty

Department: General Studies

Classes:

Math, Psychology, Sociology

Faculty Headcount: 3

#### *Guideposts and Metrics*

- **Guidepost 2:** Does not matriculate to an S&E 4-year program  
Not a program, does not draw students from out-of-state  
Not designated as an O\*NET STEM program
- **Guidepost 4:** Not a program, but provides service courses

#### *Initial Thoughts*

- Recommendation is to eliminate the General Studies department and have the Liberal Studies and Math departments coordinate and teach the math, psychology, and sociology classes at Highlands
- Recommendation is to reduce the faculty by one position

#### *Net Change in Faculty:* -1 FTE

- The Math and Liberal Studies departments (CLSPS) will be responsible for the over-all coordination and delivery for math, psychology, and sociology at Highlands College. Highlands's faculty will remain at Highlands and continue to be part of the MTYCFA bargaining unit. They will also be affiliate faculty for the north campus.

Department: ACES

*Initial Thoughts*

- Move reporting structure/staff under ACE (combine ACE and ACES)
- Move Perkins Grant under Assistant Dean

*Net Change in Faculty*

No change in faculty

DRAFT

Program: Associate of Science (AS)

Credentials Awarded:

Associate of Science

Faculty Headcount: 1

#### *Guideposts and Metrics*

- **Guidepost 2:** May matriculate to an S&E 4-year program
  - Does not draw students from out-of-state
  - Not designated as an O\*NET STEM program
- **Guidepost 4:** Program aligned with north campus degree
- **Enrollment:** The AS program remains the largest program at Highlands College, in spite of a drop in total FTE enrollment. Much of that drop can be explained by a change in placement policies that allow students with lower ACT scores to be enrolled in either FEP or FESP, where previously they would have been placed in the AS program.

#### *Overall observations*

The AS program is mainly used as a 24-30 credit pre-engineering and science, pre-business, or pre-healthcare preparation program. It is vulnerable to any changes in the student enrollment process and cut scores used on north campus.

#### *Initial Thoughts*

- The AS Student Learning Outcomes should be identical to the General Education Learning Outcomes used by the Montana University System and Montana Tech, and the degree program should become a transferable degree program regardless of the destination institution
- Guided Pathways should be well-developed to align with meta-majors, meaning that recommended plans of study will include gateway courses into specific majors when possible
- The AS program will collaborate with the Liberal Studies Department to meet the needs of the students
- With the elimination of the General Studies Department the AS program advisor/instructor will be a direct report to the Assistant Dean

#### *Net Change in Faculty*

No change in faculty

## Unit-by-Unit Non-Academic Recommendations

### Chancellor Office

#### Comments

Lowest administrative expense in the MUS based upon percentage of Institutional support as percent of net expenditures, per OCHE – latest numbers for FY19 budgeted [https://mus.edu/data/operating\\_budgets/InstitutionalOpBudgetMetrics.asp](https://mus.edu/data/operating_budgets/InstitutionalOpBudgetMetrics.asp)

Montana Tech	8.74%
MSU	8.9%
UM	9.8%
MSUB	9.9%
Western	10.9%
MSUN	11.6%

**OCHE definition of Institutional Support** is the program where most administrative expenditures are recorded. Expenditures for executive-level activities concerned with management and planning for the institution, legal services, fiscal operations, administrative data processing, employee personnel and records, purchasing, support services for faculty and staff, development, and alumni relations.

#### Concerns

Will need to budget \$90K for Chancellor Search  
Chancellor salary the lowest in OCHE peer group by 50% - may inhibit search

#### Recommendations

Reduce operating/capital by \$25,000

#### Cost savings

\$25,000

## Research Office and Graduate School

### Degrees Offered (through SME and CLSPS)

- 1 Ph.D.; 12 Master's degrees (two via distance; one both distance and on campus); 3 Graduate certificates (one via distance)

### Guideposts and Metrics

- **Guidepost 1:** Ph.D. program and all M.S. programs except TC and IMS are in S&E CIP codes. Most IMS individualized curricula strongly emphasize S&E (not reflected in the CIP code). Two graduate certificates are S&E. Contract and grant expenditures (\$8.3 M in FY17) are 75% S&E and additional 19% education/outreach with strong S&E emphasis. Undergraduate Research Program (URP) is >90% S&E.
- **Guidepost 3:** On-campus graduate programs all are research intensive (thesis, project, practicum, or capstone). Campus research significant investments in research capacity, research infrastructure, faculty and student conference attendance, and new faculty start-up (small as it is). Other than \$40 K/year for part of URP, none of this funding comes from the operating budget.
- **Enrollment:** Grad school enrollment has grown by more than 50% in 5 years and is now over 250 (up from ~6% to ~10% of Tech's total).
- **Expenditures:** \$196 K from general budget in FY18, including URP. Grad school and RO are net revenue generators subsidizing other functions.
- **Research:** RO has helped raise grant competitiveness. Research expenditures up from \$11.7M in FY12 to \$13.1M in FY17, including 3 NSF MRI grants and major funding through CAMP for materials science and engineering research supporting faculty and students in ~6 departments. Overall proposal volume has risen about 50% since FY15 to 143 in FY18.

### Overall Observations

Grad School, Research Office, Sponsored Programs Office, and Safety provide essential functions, which strongly support Tech's Special Focus mission and Guideposts 1 and 3. Concern about sustainability of CAMP, possible other Centers of Excellence, and continuing to grow competitive research funding.

### Initial Thoughts

- Establish M.Eng. (distance), MS in Restoration, & two more Ph.D. programs.
- Terminate HCI certificate due to persistently low enrollment.
- Enhance/rename/refocus 30-credit, coursework-only MPEM to broaden appeal, grow enrollment, and achieve its potential as a valuable and valued credential for individuals managing technical projects or seeking career advancement in this area. Possibly partner with employers to pre-enroll cohorts or for on-site short courses. Promising synergies between updated MPEM and M.Eng.
- Expand distance offerings supporting Master's degrees, where there is high demand by B.S.-educated workers in remote locations, including military.
- Match graduate enrollment to demand and capacity for each M.S. program.
- Develop strategy for funding meaningful start-up offers to attract faculty who will bring research funding and accelerate their grant success.

*Net Change in Staff from 2018/19: None.*

## Academic Center for Excellence

### *Services Offered:*

- Tutoring (Drop-in, Private Appointment, and Supplemental Instruction)
- Academic Coaching
- Incoming Freshman Registration (CLSPS)
- Director teaches 2 sections of MT1016 each term, does retention interventions, and campus outreach (seminar presentations, workshops, etc.)

2018-2019 Staff head count = 1

### *Metrics*

- Montana Tech has the lowest student fee (\$10) associated with tutoring in the MUS (UM-Western is \$20). ACE offers ~ 70 hrs. of tutoring a week as compared to UM-Western offering ~28 hours
- Montana Tech has the smallest staff (1 person) compared to similar sized MUS schools and our Peer Institutions (Median is 3 people)
- Fall 2017/Spring 2018 293 individuals used ACE, totaling 1,834 visits
- 96% of students using ACE's services in 2017/2018 rated it as Great (85%) or Good (11%)
- ACE has received positive ratings on each annual program review (2014-2015, 2015-2016, 2016-2017, and 2017-2018).
- ACE has an operating budget of 1,750 dollars. In FY2017 and FY2018 it was zeroed out and ACE used its foundation account to cover all operating expenses

### *Overall Observations*

ACE has done a great job serving students with minimal funding. In an effort to be fiscally responsible ACE monitors student employment hours with services hours each month. The director makes adjustments if hours worked becomes significantly higher than student hours serviced. With only 1 staff member if the Director is sick or out for vacation there is no one to manage the Center.

### *Initial Thoughts*

- Increase the operation budget from 1,750 to 5,000. This would allow the director to have access to professional development and cover the cost of tutoring supplies.
- For Fall of 2019 the addition of a Tutor Coordinator (~35K) would allow the Director to focus more on campus outreach and retention interventions and creates a back-up so ACE is never without a supervisor.

### *Net Change in Staff from 2018/19*

None.

## Campus Life

### *Services Offered:*

- Residence Hall Management (Excluded below because this is an auxiliary)
- Management of the Student Unit Building
- Supervision of ASMT (includes: Clubs & Oredigger Media)
- New student Orientation (Freshman, Transfer, Fall and Spring)
- Management of all student activities/entertainment

2018-2019 Staff head count = 2

### *Metrics*

- July 1-Nov. 9: 865 room reservation requests have been processed (~10 reservations are processed per day)
- New Student Orientation covered 4 days (Wed – Sat). Wed and Thursday featured 9 informational, education and entertainment sessions for all students. An average of 136 students attended each session with Convocation drawing the largest crowd with 242 students. Friday featured various information breakout sessions where students were able to choose based on their interest. Saturday students had a choice between local experiences (Touring the World Mining Museum, Lady of the Rockies and searching through Sapphire gravel). Each outing averaged about 30 students.
- Work with ASMT – Director of Campus Life meets formally with ASMT and ASMT leadership formally and informally approximately 4 – 5 time a week. He also meets with clubs to go over budgets, reimbursements and reviewing past spending and fundraising plans. Overall the Director of Campus Life spends about 15 hours per week working on ASMT related areas.
- Campus Entertainment – Fall semester there has been 11 campus wide events for the students as of November 9<sup>th</sup>. Overall attendance has average of 122 per event, with 246 attending the comedy show on Oct 1. There are 3 events planned for the remaining 4 weeks (no event Thanksgiving week) before finials.
- 

### *Overall Observations*

The Re-organization that was implemented July 1, 2018 seems to be working very well. The new director and coordinator are able to handle the work load and have created a lot of efficiencies.

### *Initial Thoughts*

- Continue to assess and evaluate programming
- Evaluate if we are charging enough for external agencies to use the space

### *Net Change in Staff from 2018/19*

Reduced by 1

## Enrollment Services

### *Services Offered:*

- Process all applications for admission and graduation
- Responsible for the management of all student's educational records and process all procedures associated with educational records
- Serve as the "one stop shop" for helping students, faculty, and staff navigate the institutional processes
- Management of the course schedule and catalog

2018-2019 Staff head count = 9

### *Metrics*

- According to the American Association of Collegiate Registrars and Admissions Officers the recommended number of staff for a campus our size is 10.
- Enrollment Services conducts over 4,000 course transfer evaluations per year
- Enrollment Services schedules 2,500 courses per year
- Processing materials is the bulk of Enrollment Services job; 47% is spent on registration, 26% on Applications for Admission, 14% on Graduation Applications, and 13% on Transfer Evaluations
- July 1-November 1 they had 5 staff resign and need to be replaced

### *Overall Observations*

Enrollment Services is currently understaffed and this could contribute to low satisfaction among faculty, staff, and students because they are not pleased with the amount of time it takes for their questions/concerns to be answered. The lack of support (financial and personnel) and high demands of the position could be one factor that contributes to the high turnover rate among staff.

### *Initial Thoughts*

- An Enrollment Specialist position should be hired to focus on common course numbering and the catalog and to assist with graduation applications

### *Net Change in Staff from 2018/19*

None

## Financial Aid

### *Services Offered:*

- Ensures compliance with Department of Education Title IV Funds
- Process all of Student Employment
- Manages all Financial Aid packages
- Manages all Financial Aid Appeals
- Hosts a Financial Aid Session on all campus visits

2018-2019 Staff head count = 4

### *Metrics*

- National Association of Student Financial Aid Administrators recommends that with our Fall 2018 enrollment numbers we should have a minimum of 6 staff members, we currently have 4.
- 2015 official cohort default rate 12.4%, The national average is ~11%
- 68% of students apply for need based aid (\$5.6 Million is awarded)
- 56% of Montana Tech undergraduate students (North and South) receive a grant or scholarship, 30% have a Pell Grant, and 39% have federal student loans
- The bulk of our Financial Aid staff's time is dedicated to verifications/file reviews, loan processing, and scholarship management (which must be done); the least amount of time is spent on customer service and financial aid counseling.

### *Overall Observations*

Our financial aid department is understaffed and barely able to be administratively capable. If the cohort default rate rises above 15% we can only do single disbursements for one semester and have to hold loans for 30 days for first time students. This could have dramatic impacts on new student enrollment.

### *Initial Thoughts*

- An Assistant Director position needs to be added back to help the Director. The Director is currently doing all of the functions of a Director and Asst. Director.
- A Financial Aid Specialist level I position needs to be added in order to focus on default prevention counseling, campus visits, and customer service.

### *Net Change in Staff from 2018/19*

None. The Director retired June 30, 2018 and the Assistant Director was promoted to Director. The Assistant Director line was converted to a Financial Aid Specialist. In 2014-2016 there was a full-time Financial Aid specialist that focused on default counseling, financial literacy, and campus visits (it was a grant funded position) when the grant ended all of those duties were either absorbed or discontinued.

## Student Development/Counseling

### *Services Offered:*

- Dean of Students
- Disability Services/Mental Health Counseling
- International Services (includes HiSet testing/proctoring and Health Insurance)

2018-2019 Staff head count = 4

### *Metrics*

- During Fall 2018 (July 1-Nov. 9) the Dean of students has overseen 18 non-academic conduct incidents involving 12 individuals, had 172 meetings with students, faculty, and/or staff, reviewed 19 student withdrawals, 33 appeals (Academic and Financial Aid), and had conversation with 14 parents.
- Disability Services: South Campus= 22 students; North Campus = 68
- Montana Tech's Student: Counselor ratio is 2583:1 and the National standard for is 1500:1
- South campus counselor has seen 23 individuals 94 times and the North campus counselor has seen 42 individuals 154 times so far this semester (Fall 2018)
- July 1-Nov. 9 International Services: conducted 120 international student SEVIS registrations, processed 3 International faculty visa/residencies, conducted 16 HiSet test sessions (6 on-campus, 10 off campus), proctored 15 individual exams, and processed 93 student health insurance cases

### *Overall Observations*

Student development/counseling is able to get by with the current staff but the Dean of Student is often spending time working on tasks that could be done by an administrative associate instead of working on higher level institutional planning. Montana Tech's Dean of Students is the only one in the MUS that does not have an administrative associate. Disability Services is usually separated from Mental Health Counseling. At Montana Tech it is housed within the same position. Having counselor's/disability coordinators on both campuses is important. International Services position is needed but spread thin because of the other responsibilities. The lack of staff contributes to less services being available to students.

### *Initial Thoughts*

- An administrative associate should be hired to assist the Dean of Students and North Campus Counselor/Disability Coordinator
- For Fall 2019 a professional advisor should be hired to coordinate the North campus disability services in addition to their advising duties. This would improve our student: counselor ratio.

### *Net Change in Staff from 2018/19*

None

## Undergraduate Recruitment

### *Services Offered:*

- On the road recruitment
- Management of communication plan (digital and print recruitment)
- Recruitment Event Planning & Campus Visits/Tours
- New Student scholarships
- Interacting with students in the recruitment funnel (perspective, inquiry, applied, enrolled) ranging from Freshman to Seniors in High School (phone calls and email)

2018-2019 Staff head count = 8.5

### *Metrics*

- Montana Tech's applicant to recruiter ratio is 337:1 and Public Universities less than 3,000 ratios is recommending to be 300:1
- Face-to-Face attention between students and recruiters at public universities with less than 2,750 students is recommend to be 74:1, Montana Tech is 134:1
- 2017-2018 Campus tour survey (N=840) 70% rated tour guide as outstanding, 29% rated tour guide as above average or average
- New freshman enrollment was up 10% over Fall 2017
- Recruitment hosts 15 events per year
- Montana Tech invested an additional \$10K in name acquisition for FY18-19 (26,889 vs 15,483)
- Fall 2019 freshman applications are up 181% over this time last Fall, Transfer Applications are up by 7.

### *Overall Observations*

With recent investments in undergraduate recruitment we hope to see another increase in new freshman in Fall 2019. Transfer student numbers are down (primarily due to Canadian students).

### *Initial Thoughts*

- Continue to assess Undergraduate Recruitments efforts

### *Net Change in Staff from 2018/19*

None

## Alumni Engagement

### *Services Offered:*

- Alumni Communication
- Alumni/Student Networking Events
- Reunions/Alumni Awards
- Executive Director Alumni Association
- Alumni Chapter Development
- Database Integrity
- Campus Department Collaboration
- Alumni Participation/contributions metrics
- Fundraising/Stewardship

2018 – 2019 Head Count Staff: 2

### *Metrics*

- The Alumni Office uses several methods of communicating information to the Montana Tech alumni. Examples are quarterly newsletter, industry site visits Tech Town Hall, Social Media, and personal phone calls and emails.
- The Alumni Engagement Office completed 59 alumni/student networking events in FY18. Events completed for FY19 to date is 22. There are 8 additional events currently in the planning phase.
- The Alumni Office annual identifies alumni through reunions and recognition awards.
- The Alumni Engagement office continues to increase the footprint of Montana Tech across the United States and Canada. FY18 recognized 14 area chapters. Currently in FY19 there are 17 recognized chapters.
- The Alumni Office collaborate with Career Services to identify student interns for networking events and assists to identify alumni as mentors.
- The Alumni Office maintains and updates 13,656 living alumni recorded the Raiser's Edge Database daily. Comparison between FY17 and FY18 shows 75% increase in constituents added. 53% increase address changes. 130% increase in primary business updates. 64% increase in primary business information added, -9% LinkedIn Profiles added. 251% increase in Facebook profiles added.
- The Alumni Office collaborates with all departments on Montana Tech campus to provide mass email services through On Line Express and alumni identification /queries. FY19 to date saw 12 On Line Express emails distributed and 61 constituent queries distributed for campus departments.
- Alumni engagement and contributions monthly metrics. The goal for FY18 was 15 - 20% of actively engaged. FY18 ended with 19%. Individual alumni contributions remained flat at 9% for FY18. Alumni contributions to multiple funds increased FY18 20.07%. The goal of FY19 is to increase actively engaged alumni to 20-22%, alumni contributions to 10 -11%, and contributions to multiple funds to 20%.
- The Alumni Engagement Director's fundraising goal for FY19 is \$250,000.
- The Alumni Engagement Office saw a decrease from FY17 to FY19 of 27% in its operations budget.

### *Overall Observations*

- The Alumni Engagement Office continues to increase alumni engagement, database integrity, and collaborations with campus departments and student organizations.
- With budget reductions the Alumni Office has drastically decreased the amount of hard mail that is sent to its constituents. The Alumni Office uses strategic methods in communicating with alumni through social media, email, and phone call correspondence.

### *Initial Thoughts*

Thirty percent of the Montana Tech alumni have graduated within the last 10 years. Individual conversations with alumni graduating in that time frame indicate a strong need in correspondence via social media or an online networking platform. The Alumni Office has reviewed several platforms that are available as well as those used by our peer institutions unfortunately the annual cost and manpower hours need are not available with the current budget provided by the state.

*Net Change in Staff FY19:* None

## Career Services

### *Services Offered:*

- DIGGERecruiting – DR 2.0
- Career Coaching (Career Assessments, Appointments, Resume Reviews)
- Outreach – Class Presentations & Workshops
- Employer Visits & Career Fairs
- Experiential Learning & Internships
- The Outcomes Survey (also includes Alumni Career Services)
- Teach Employment Strategies (MT 0220) to students at Highlands College

2017-2018 Staff head count = 4 (lost one person in October 2017)

2018-2019 Staff head count = 3 (lost one person in November 2018)

### *Metrics*

- DIGGERecruiting – 2017-2018 total accounts – 1,435 students and alumni
  - DR 2.0 is slowly being implemented; total # active students - 932 (as of 11/9/2018)
- 2017-2018 Student Appointments – 193 Total | 40 Walk-in | 48 by Email
  - Fall 2018 Student Appointments 28 (as of 11/9/2018)
- 2017-2018 Proactive Student Resume Reviews – 498 (a decrease of 4.6% over last year)
  - Fall 2018 – 1,004 resumes reviewed (as of 11/9/2018)
- 2017-2018 Workshop – 20 Workshops with approx. 214 students
  - Fall 2018 – 3 Workshops with approx. 24 students (as of 11/9/2018)
- 2017-2018 Class presentations – 24 across depts./career-related topics | approx. 616 students
  - Fall 2018 – 16 across depts./career-related topics | approx. 512 students (as of 11/9/2018)
- 2017-2018 Career Fair – Fall: 97 employer/ 772 students (Spring: 50 employers/287 students)
  - Fall 2018 - 111 employer/ 844 students
- 2017-2018 On-Campus Recruiting – 68 companies, 703 interview with 388 students
  - Fall 2018 - 66 companies, 758 interviews (as of 11/9/2018)
- Montana Tech has an efficient staff through working with faculty and departments across all colleges, reaching a higher percentage of students than our counter-parts in the state.

### *Overall Observations*

Career Services collects and uses data to evaluate various services. The office consistently receives positive comments from employers about their recruiting experience at Montana Tech. The ability to provide detailed feedback to students is impressive given the small staff size. With the incoming students (Gen Z), more individualized, proactive attention will be required to ensure students meet employer expectations for career readiness. Employer development continues to remain a high importance not only for new, but existing too.

### *Initial Thoughts*

- Restoring the operational budget to FY18 numbers, would allow the staff to maintain software, develop new programs and activities, collaborate with other departments to reach more students, and cultivate new relationships with employers and alumni.
- Allowing income and keeping in place reserves for both the Students Fees and Career Fair accounts, allows continued collaboration with departments, supports student engagement, and gives the ability of the office to provide expected level of customer services and events to students and employers despite changes in enrollment or the economy.

*Net Change in Staff from 2018/19: Reduced one FTE in FY19.*

DRAFT

## Public Relations & Marketing

2018-19 Staff Headcount: 3

### *Services Offered:*

- Community outreach
- Internal and external advertising, communications, marketing, and branding
- Video production
- Story and content writing
- Photography
- Brand licensing
- Alumni publication development
- Event planning
- Publication design and review
- Graphic design
- Web design and development
- Web updating and review
- Brand implementation
- Social media oversight
- Initiative and campaign development

### *METRICS*

- Designed over 1,000 design pieces. Print and web based, both small and very large scale.
- Continued to create a more consistent and recognizable brand
- Set standards on campus for departmental print pieces
- Increased media presence: 6,127 U.S. mentions and 7,711 global mentions, which compares to 5,334 U.S. mentions and 6,221 global mentions in FY17 and 3,692 U.S and 4,091 global mentions in FY16.
- Issued over 200 press releases to local and state media
- Website work included migrating content to new site. Previous site had over 1,000,000 assets (10/1/17 through 5/12/18)
- Website work (5/13/18 through 10/31/18)
  - Launch of new mobile-friendly website with no down time
  - 1,037 pages and downloadable documents (PDFs, Word documents etc.)
  - Maintain the website with an average of 200 edits per week
  - Published 55 news articles
  - Published 87 calendar events
  - Continual work on Search Engine Optimization and website accessibility
  - 160,026 unique visitors, 70.3% new and 29.7% returning
  - 1,411,779 page views
- Oversee social media channels which have continued to increase and engage with our audiences:
  - Facebook
    - January 2, 2018 – 9,033 page likes
    - November 9, 2018 – 9,800 page likes

- Twitter
  - Gained 276 followers since Jan 2018 putting us at 2,170
- Instagram
  - On January 4, 2018, we had roughly 1,500 followers, now we have 2,378
- Produce two alumni magazines per year with stories focusing on faculty, staff, students, and alumni. MNews is mailed to approximately 14,000 alumni and friends in the US and Canada
- Coordinated and developed a number of videos about campus, alumni, and giving to add to our video library

#### *OVERALL OBSERVATIONS*

We need to continue to build relationships with educators across Montana and get in front of as many students as possible. Prior to about 2006, Montana Tech did not have a brand. Since then, a consistent, recognizable, strategic brand has been launched and executed. We are currently in a strong position to extend our brand further than we ever have in order to grow the campus.

#### *Net Change In Staff (2018/19)*

None

## Facilities

### *Services Offered:*

- Custodial services.
- Grounds keeping, includes snow removal.
- Security/Parking.
- Motor Pool.
- Maintenance of all buildings and projects.

2018-2019 head count = 43.

### *Stakeholders Served and Metrics:*

- Campus community – students, faculty and staff. Butte community and various vendors.
- The Association of Physical Plant Administrators (APPA) are the leaders in educational facilities and work in conjunction with NACUBO in setting metric service standards.
- Tech has approximately 472,000 square feet of office/classroom/lab space. 210 acres and 30 buildings.
- With current levels APPA puts Tech in the casual inattention to moderate dinginess category of clean. This can have an overall impact on potential students visiting campus – as well as their parents.
- Currently there 5.5 FTE in Security for 24/7 coverage. The additional FTE addition cost could be covered by better parking control/ticketing revenue.
- APPR average metric for grounds keeper's states that we should have a minimum of 10 FTE's for the size campus versus the 3 FTE that we currently have.

### *Observations/Thoughts:*

- Maintenance & Trades is considered adequately staffed. Where we fall short is not have a preventative maintenance program. Everything is done manually but with the implementation of the computerized management maintenance system (CMMS) this will be taken care of.
- Aging buildings and infrastructure.
- Director is currently analyzing future staff restructuring and eliminating the assistant director and replacing with a lower cost supervisor. Motor pool structure is also being evaluated.
- Currently implementing the CMMS that should produce cost savings in the long run. Will identify when filters need to be changed, etc.
- Evaluating an automated parking decal/ticketing system.

*Net Change in staff from 2018/2019:* 1 FTE reduction. Facility organization structure is being evaluated and could result in another 1-2 FTE reduction.

## Human Resources

Payroll Department included.

### *Services Offered*

- Provides information and guidance in areas of employee relations and employment.
- Labor relations and negotiations.
- Benefits and salary administration.
- Staff development.
- Payroll and contract processing for all employees and students. This includes all adjunct contracts.

2018-2019 head count = 2 for HR and 1.5 for Payroll.

### *Stakeholders Served and Metrics*

- Campus community – senior management, faculty and staff, OCHE, and outside companies.
- National metrics for HR and payroll (PR) are provided by CUPA/BNA/SHRM.
- Based on metrics Tech is significantly understaffed in HR. National university average is 1:82 employees. Minimum staffing is 1:100 employees which would be 5 FTE's in HR.
- Average metric for just payroll is 1:250. With 500 employees and 500 students that equates to 4 FTE's.

### *Observations/Thoughts*

- Increasing liability and risk requires getting policies and procedures in place.
- Need for more formal and recurring faculty/staff training.
- Payroll processing is taking longer.
- Reorganize by moving payroll from finance to HR and add additional staffing for both.

*Net Change in staff from 2018/2019: None*

## Finance & Budget

### *Services Offered*

- Data Reporting for management, federal, state, OCHE.
- Provides financial analysis of enrollment, athletics, financials and budget information.
- Accounts payable and Procard
- Sponsored program and grant accounting services
- Business Office – tuition billing and collections
- Purchasing
- Payroll was included in Human Resources.

*2018-2019 head count = 9*

### *Stakeholders Served and Metrics:*

- Campus community – senior management, students, faculty and staff.
- Tech has the lowest Finance staffing in the MUS, 2 additional accountants is the minimum requested by Internal Audit and we would still keep Tech with the lowest staffed finance office.

### *Observations/Thoughts:*

- Staffing levels are inadequate, internal control and auditing of revenue producing areas in order to ensure compliance.
- Financial data analytics can drive management decision making.
- Many of the processes are paper driven so we are looking to implement automation where feasible and cost effective. Some of this includes:
- Utilizing GrizMart for purchasing more items. This would automate accounts payable to a greater extent.
- In process of implementing automated faculty/staff contract issuing/tracking software.
- In process of evaluating Banner baseline timekeeping (would eliminate most paper timecards).
- Evaluating third party partner with Banner for delinquent student accounts.
- Preparing RFP for integrated time clock system.

*Net Change in staff from 2018/2019: None*

## Information Technology Services

### *Services Offered*

- Lab computers and support including all software.
- Provides local area network (LAN) to campuses and student housing.
- Provides wireless coverage on campus.
- Provides internet service, banner and many other programs.

*2018-2019 head count = 12*

### *Stakeholders Served and Metrics:*

- Campus community – students, faculty and staff.
- Metrics are provided by Educause and indicate that the average tech support ratio should be 1 tech to 100-150 computers. Tech has approximately 1600 computers to maintain which would put our metric at 1:320.
- Observations/Thoughts:
- No redundancy if a server fails, there are also no redundant switches for all the buildings on Tech which keeps the information flowing.
- Hardware and Data Center now over 10 years old, backup generator needs costly repairs, air conditioning unit is old and there is no redundancy. The uninterruptible power supplies are also starting to fail and need to be replaced.
- Lacking tools for monitoring of systems and security. A data breach is at a higher risk due to this which could have legal and financial implications.
- Staffing – both in number of staff and lack of market salaries.
- Increasing cost of all support for software and licensing.
- Wireless coverage for the campus. At current rate will take another 5 years to have 90% wireless coverage on the north campus.
- Restructured IT during FY2018 which resulted in overall salary cost savings of \$35,000.

*Net Change in staff from 2018/2019: 2 FTE were eliminated.*

## Institutional Research

### *Services Offered*

- Data Reporting for federal, state, OCHE.
- Provides analysis of enrollment, athletics, and finance.

*2018-2019 head count = 1*

### *Stakeholders Served and Metrics:*

- Campus community – senior management, faculty and staff
- The national average for staffing for institutional research for Tech's size is 3.

### *Observations/Thoughts:*

- Increasing data reporting that is both Federal/State/OHCE mandated and internal requests for additional data is critical to the operation of the University.
- Data analytics can drive management decision making.

*Net Change in staff from 2018/2019: None*

## Environmental Health & Safety

### *Services Offered*

- Lab safety training for all students that have a lab.
- Monitors all the chemical inventory on campus and its disposal.
- Works with departments and individuals on work safety and ergonomic work environments.
- Oversees emergency notification system for the University including by not limited to fire evacuation drills and active shooter training.
- Works closely with HR on worker's comp program and is University rep.

*2018-2019 head count = 1*

### *Stakeholders Served and Metrics*

- Campus community – senior management, faculty and staff
- Butte community – works closely with the local fire and police departments and with State authorities.
- CSHEMA (Campus Safety Higher Education Management Association) measures staffing based on 4 criteria. They state that these measurements equate to 80% of how EHS is staffed across the country. Based on this criteria staffing would be at a minimum 2 FTE's.

### *Observations/Thoughts*

- Increasing federal and state regulations.
- This is a State mandated position and yet is funded on soft funds.
- This position needs to be more aligned with security/public safety.

*Net Change in staff from 2018/2019: None*

## Distance Learning

### *Services Offered*

- Technical support for online/distance learning community

*2018-2019 head count = 1*

### *Stakeholders Served and Metrics*

- Campus community: students, faculty, and staff
- Supports three distance-based graduate programs (HCI, IH, MPEM)
- Distance Learning Coordinator is the “go to” person for all campus distance education needs.

### *Observations/Thoughts*

- This office will see more significance/importance when the Masters of Engineering Degree begins.

*Net Change in staff from 2018/2019:* None. One FTE was eliminated last year.

DRAFT

## Library

### *Services Offered*

- Provides resources/services which support the academic/research needs of students, faculty, and the community.
- Hosts Montana Tech's Institutional Repository - *Digital Commons*.
- The only U.S. Patent Library in Montana.
- Interlibrary loans
- Hosts the Author's reception

*2018-2019 head count = 8.5*

### *Stakeholders Served and Metrics*

- Campus community
- Butte community

### *Observations/Thoughts*

The Montana Tech library is an integral entity on the Tech campus. Accrediting agencies (NWCCU, ABET, etc.) continuously recognize the library

*Net Change in staff from 2018/2019: None*

## Institute for Educational Opportunities

### *Services Offered*

- The Institute is the “Outreach” arm of the Tech campus.

2018-2019 head count = 19.5 (19 of these FTE are funded from grants)

### *Stakeholders Served and Metrics*

- Campus community
- Butte and surrounding area

### *Observations/Thoughts*

IEO is responsible for the following outreach programs: Dual Enrollment, TRIO Pre College, TRIO SSS, GEAR UP, Jump Start, CFWEP, among others.

*Net Change in staff from 2018/2019:* None

DRAFT

## Athletics

### *Services Offered*

- Montana Tech offers six varsity sports: Men's Football, Women's Volleyball, Men's Basketball, Women's Basketball, Men's Golf, and Women's Golf.
- A large number of Tech's student/athletes would not attend if they had not had the opportunity to participate in athletics.

*2018-2019 head count = 12.52*

### *Stakeholders Served and Metrics*

- Campus community
- Butte and surrounding area

### *Observations/Thoughts*

Athletics has developed a strong relationship with campus recruiters to identify and recruit students that fit the academic profile of Montana Tech. Athletics is leading the recruiting efforts of out-of-state students through social media recruiting strategies. The campus should consider starting men's and women's cross-country team. Immediate impact would be 15-20 student athletes.

*Net Change in staff from 2018/2019:* Reduce by One non-coach FTE, move ½ assistant coach salary to DAA.

## Summary

Program	Page Number	FTE Change	Comments
<b>SCHOOL OF MINES AND ENGINEERING</b>			
Civil Engineering	2	No Change in FTE	
Electrical Engineering	3	Add One FTE	
Environmental Engineering	5	Reduce One FTE	
Geophysical Engineering	6	Reduce Two FTE	Eliminate BS program and initiate MS program. Combine with Geological Engineering.
Geological Engineering	8	No Reduction in FTE	
Mechanical Engineering	9	Add One FTE	Move a faculty member from Metallurgical
Metallurgy and Materials Engineering	11	Reduce One FTE	Move faculty line to Mechanical Engineering
Mining Engineering	12	No Change in FTE	
Petroleum Engineering	13	Reduce One FTE	
Safety Health & Industrial Hygiene	14	Reduce One FTE	See Applied Health & Safety Science
Applied Health & Safety Science	14	No Change in FTE	Move faculty line to Biology
<b>COLLEGE OF LETTERS, SCIENCES, AND PROFESSIONAL STUDIES</b>			
Biological Sciences	15	Add One FTE	Move faculty line from SHIH
Business & Information Technology	16	Reduce One FTE	Leave vacancy unfilled
Chemistry/Geochemistry	18	Reduce One FTE	
Computer Science/Software Engineering	20	Add One FTE	Leave retirement unfilled. Move two faculty from Data Science/Statistics

Data Science and Statistics	22	No change in FTE	Eliminate Program. Move two FTE to CS/SE and move one FTE to Mathematics
Healthcare Informatics	24	Reduce Three FTE	Eliminate Program
Liberal Studies	26	Add Two FTE	Move Two faculty lines from PTC
Mathematical Sciences	28	No Change in FTE	Move One FTE from Data Science/Statistics and leave retirement unfilled
Network Technology	30	No Change in FTE	
Nursing	31	No Change in FTE	
Professional and Technical Communication	33	Reduce Two FTE	Eliminate Program. Move Two FTE to Liberal Studies
Writing Department	35	No Change in FTE	
<b>HIGHLANDS COLLEGE</b>			
Business Technology	36	Reduce One Third FTE	
Accounting	38	No Change in FTE	
Network Technology	39	No Change in FTE	
Nursing Assistant	40	No Change in FTE	
Medical Assistant	42	No Change in FTE	
Radiologic Technology	43	No Change in FTE	
Behavioral Health	44	No Change in FTE	
Metals Fabrication	45	No Change in FTE	
Precision Machining	46	No Change in FTE	
Automotive	47	No Change in FTE	
Construction	48	No Change in FTE	
Drafting Technology	49	No Change in FTE	
Civil Engineering Technology	50	No Change in FTE	

Line Program	51	No Change in FTE	
General Studies	52	Reduce One FTE	Eliminate Department
ACES	53	No Change in FTE	
Associate of Science	54	No Change in FTE	
	Net Change in Faculty FTE	Reduce by 8.33 FTE	
<b>OTHER</b>			
Chancellor's Office			Reduce Operating Budget by \$25K
Research Office/Grad School	56	No Change in FTE	
Academic Center for Excellence	57	No Change in FTE	
Campus Life	58	No Change in FTE	One FTE was reduced last year
Enrollment Services	59	No Change in FTE	
Financial Aid	60	No Change in FTE	
Student Development/Counseling	61	No Change in FTE	
Undergraduate Recruitment	62	No Change in FTE	
Alumni Engagement	63	No Change in FTE	
Career Services	65	No Change in FTE	One FTE reduction in FY 19
Public Relations and Marketing	67	No Change in FTE	
Human Resources	69	No Change in FTE	
Facilities	70	Reduce One FTE	Two FTE eliminated in FY 18
Finance & Budget	71	No Change in FTE	Two FTE were eliminated in FY 18
IT Services			Two FTE were eliminated in FY 18
Institutional Research	73	No Change in FTE	

Environmental Health & Safety	74	No Change in FTE	
Distance Learning	75	No Change in FTE	One FTE was eliminated in FY 18
Library	76	No Change in FTE	
Institute for Educational Opportunities	77	No Change in FTE	
Athletics	78	Reduce by One FTE	
	Net Change in FTE	Reduced by 10.5 FTE	

## APPENDIX A. Complete WIRE Recommendations

### Executive Summary

At their March 10, 2017 meeting, the Montana Board of Regents (BOR) approved a fourth institutional classification for higher education units in the state. The new classification, Special Focus Four-Year Universities, of which Montana Tech is the only unit, was added to the previous three classifications: Two-Year Colleges, Four-Year Regional Universities, and Research Doctoral Universities. Prior to its new classification, Montana Tech was included in the Four-Year Regional Universities classification. This new classification was in part due to the unique mission and high quality of Montana Tech and a recognition of the opportunities a Special Focus designation might afford Montana Tech.

As a response to its new institutional classification by the BOR, Chancellor Blacketter formed WIRE (Workgroup for Institutional Realignment for Excellence) in late March 2017. The charge given to WIRE by Chancellor Blacketter was to “define what it means to Montana Tech to be classified as the only Special Focus Four-Year University in the state.” The 13-member committee, comprised of faculty, staff and administrators, met with a wide range of campus entities to discuss the impact of the new classification. Since April of 2017, WIRE has met with numerous groups both on and off campus to create a set of recommendations for Chancellor Blacketter. This report contains the preliminary recommendations of the group.

**Recommendation I: Montana Tech embraces the Special Focus BOR designation as a premiere Science and Engineering institution dedicated to meeting the changing needs of society**

**Recommendation II: Montana Tech will have a nationally competitive applied research culture**

**Recommendation III: Our approach to curriculum will focus on integrated problem solving**

**Recommendation IV: Montana Tech will grow the STEM workforce in Montana and beyond**

Montana Tech recognizes the need for an informed citizenry prepared to understand issues related to energy, natural resources, environment, water, data, and health. We recognize that the highly technical nature of these problems presents an obstacle to creating that informed citizenry. We recognize that Montana Tech’s mission, legacy, culture, and values promote proven solutions to these challenges.

**Montana Tech embraces the opportunity to pursue its special focus designation by becoming the science and engineering institution of choice to solve these problems now and in the future.** Montana Tech will have an ethos of educating the whole person through intensive intellectual dialogue between students and faculty across diverse spheres of inquiry.

Fulfilling our vision will require several institutional changes including:

- An institutional name that reflects our values, vision, and aspired national stature. The “of the University of Montana” invokes a regional scope that is not reflective of our role as a Special Focus Institution. WIRE strongly supports that our name change to match our brand of “Montana Tech”.
- The Chancellor should continue to report directly to the Commissioner level. This reporting line gives Montana Tech the ability to pursue collaborations with all other institutions in the MUS and beyond

- Entrance standards should measure the potential of students to succeed at Montana Tech.
- A physical and organizational restructuring that will support instructional collaboration, increased research output, and a strong general education curriculum
- Appropriate tuition/fee rates to enable Tech to offer nationally competitive programs
- Mission driven MS and PhD in focused areas of Science and Engineering
- Curricular modification/development to facilitate effective multi-disciplinary and experiential learning for all majors
- Appropriate faculty pay scales, benefits, tenure and promotion standards, workload, and incentives to attract and retain scholars

Some of these actions have obviously already been achieved fully or in part, with the rest still needing to be addressed or completed.

## History of WIRE

In April of 2017, Chancellor Blacketter formed the Workgroup for Institutional Realignment for Excellence (WIRE). Thirteen staff and faculty members were appointed to WIRE and charged with determining how Montana Tech would need to adapt to fulfill the institution's new role as a "Special Focus" institution. From April to December of 2017, WIRE members solicited feedback from the following groups:

Biological Sciences	Metallurgical and Materials Engineering	Administrative Associates
Business Information & Technology	Nursing	CLSPS department heads
Business Technology	Petroleum Engineering	SME department heads
Chemistry & Geochemistry	Professional & Technical Communication	Highlands department heads
Civil Engineering	Safety, Health, & Industrial Hygiene	Business office
Computer Science	Trades & Technical Writing	Library
Electrical Engineering	Student Affairs	Network Services
Environmental Engineering	Staff Senate	Institute of Educational Opportunities
General Engineering	Office of Research and Sponsored Programs	Highlands staff members
Geological Engineering	CAMP	CTS
Geophysical Engineering	MBMG	Industrial Advisory Boards
Freshman Engineering	Foundation Board	Chris Maples (Missouri S&T)
Mechanical Engineering	Alumnae/Alumni	Joe Thiel (consultant)
Network Technology		Gallatin College Administrators
Liberal Studies		The Commissioner of Higher Education
Mathematical Sciences		Program Prioritization Committee
Mining Engineering		

WIRE used the feedback gathered from these groups, extensive research of trends in higher education, employment predictions, and aspirational peer institutions to create the preliminary recommendations contained in this report. WIRE embraces Montana Tech's mission and historical values. Our vision is to create an institution with a national reputation for excellence in the fields of Science and Engineering, a vision that serves the citizens of Montana, the nation, and the world. All our academic programs will have a Science and/or Engineering foundation with a special focus on solving society's most pressing

problems. WIRE recognizes the importance of institutional collaboration within the Montana University System and beyond to enable Montana Tech to achieve the aforementioned national reputation.

Sincerely WIRE members,

Dan Trudnowski (co-chair)

Brian Kukay

Jack Skinner

Hilary Risser (co-chair)

Rita LaMiaux

Matt Stepan

Michael Barth

Scott Risser

Glen Southergill

Peggy Delaney

Scott Rosenthal

Trisha Southergill

Carrie Vath

DRAFT

Recommendation I:

*Montana Tech embraces the Special Focus BOR designation as a premiere Science and Engineering institution dedicated to meeting the changing needs of society*

Montana Tech is committed to building upon its legacy as the Montana State School of Mines. We recognize that the world needs energy solutions that include coal, oil, natural gas, renewable energy, mineral extraction and mineral processing. We recognize the irreplaceable benefit that energy and minerals bring to our daily lives and the complex relationship between natural resource extraction and the environment. We believe Montana Tech must provide extraction and delivery solutions that sustainably maintain and improve our environment, mitigate previous environmental damage, and uphold our conservation values held by Montanans and beyond. Montana Tech is committed to educating graduates who will be future leaders that find effective and affordable means to balance our growing needs with our environment.

Montana Tech recognizes that the needs of the state of Montana and society-at-large have evolved considerably since our founding in 1900. The National Academy of Engineering<sup>1</sup> has identified 14 Grand Challenges for the 21<sup>st</sup> century. These challenges fall into four general categories: sustainability, health, security, and joy of living. Montana Tech, with its strong legacy in science and engineering education is uniquely poised to help solve problems from all four of these areas. Montana Tech has strong programs in the health sciences, technology, scientific communication, and data analysis that will be instrumental in solving these 21<sup>st</sup> century problems.

Montana Tech realizes that today's graduates in science and engineering fields need more than just strong technical skills. The American Society for Engineering Education<sup>2</sup> has identified 15 high priority knowledge, skills, and abilities that all graduating engineers should have. These skills include: communication skills, curiosity, motivation, business acumen, critical thinking, and high ethical standards. Typically, curricula design develops students' technical skills through coursework in their program of study and soft-skills through participation in general education. However, the structure of general education does not always support the development of these skills. As described by Colleen Flaherty "The road to general education curricula is paved with good intentions, namely to round out students' educations and maybe even help them lead more meaningful lives. But over time those intentions are forgotten and programs become stale. Often, students don't know why they're required to take certain courses beyond their majors, and professors aren't sure, either"<sup>3</sup>. Montana Tech will intentionally design our curriculum, including our general education program, will be intentionally designed to support the development of both the technical and soft-skills that scientists and engineers will need to succeed.

---

<sup>1</sup> <http://www.engineeringchallenges.org/challenges.aspx>

<sup>2</sup> [https://www.asee.org/TUEE\\_PhaseI\\_WorkshopReport.pdf](https://www.asee.org/TUEE_PhaseI_WorkshopReport.pdf)

<sup>3</sup> <https://www.insidehighered.com/news/2018/01/29/colleges-share-how-they-made-their-general-education-programs-more-laundry-list>

*Goals:*

Montana Tech expects about half of our graduates will be from **engineering programs** and the majority from programs that are **anchored in the sciences**.

*Where we are now...* Currently, a little over 40% of our graduates (Associates, Bachelors, Masters, and PhD) receive degrees in engineering. Approximately 75% of our graduates receive degrees in a STEM discipline or in the health sciences. We also have unique programs outside of STEM and Health (e.g. Technical Communications, Integrated Arts and Sciences, and Business with a focus in Natural Resource Management) that are aligned to our mission.

*Where we are headed...*

- About half our graduates will be from engineering programs
- About 80% our graduates will be from programs that are anchored in the sciences
- Campus program and curricular approval forms will be modified to include information about how the new curriculum and/or program will support the special focus

Montana Tech will ensure that all graduates have both the **technical and soft-skills** needed to make them sought after employees.

*Where we are now...* Our current approach to general education follows a distribution model. Students select courses from a set of six core areas. These core areas are intended to help students develop both technical and soft skills. In some cases, majors require students to take specific courses in different areas to ensure that students develop needed core skills. For example, our engineering programs require students to take specific math, science, and writing courses. In other cases, students are left to decide which courses to take.

*Where we are headed...*

- We will analyze the current structure of our general education program with the goal to determine whether all students participating in general education are developing both technical and soft-skills.
- We will revise our assessment practices in general education courses to measure development and proficiency of specific skills
- We will use the results of the analysis to redesign our general education program.

We will position Montana Tech as the **school of choice** for engineering, science, and technical programs, as well as an institution known nationally and internationally for excellence in undergraduate education, applied research, high-demand graduates, and leadership.

*Where we are now...* Montana Tech has received awards for the Best Value Engineering School<sup>4</sup>, Colleges with the highest paid graduates<sup>5</sup> and Top 10 Best Public Universities for ROI<sup>6</sup>. The recognitions we have received are in a few select areas and do not reflect a national reputation.

---

<sup>4</sup> <https://www.bestvalueschools.com/rankings/engineering-schools/>

<sup>5</sup> <https://www.cnbc.com/2017/09/14/college-where-graduates-earn-highest-salary-in-every-state.html>

<sup>6</sup> <https://www.mtech.edu/news/2015/03/030320151.html>

*Where we are headed...*

- Remain the top Best Value Engineering School
- Improve our ranking with USNews Best colleges (regional Colleges West, Top Public schools, Best Value Schools, and Best Colleges for Veterans<sup>7</sup>)

Our **recruitment and admission processes** will seek out students with strong motivation, intellectual curiosity, creativity, and a determination to succeed.

*Where we are now...*Currently, standardized test scores and high school coursework determine admission to Montana Tech programs. Relying primarily on high standardized test scores for admission does not lead to higher graduation rates and limits the diversity of the admitted students.<sup>8</sup>

*Where we are headed...*

- We will identify qualities that are predictive of success in our programs.
- We will investigate quantifiable criteria that measure these aforementioned qualities. Options could include: becoming test score optional, factoring high school GPA into admissions, or allowing students to submit essays, portfolios, or other materials.

We will provide **resources** that help students to succeed.

*Where we are now...* We currently have multiple departments offering academic support services (professional tutors, peer tutors, online tutoring, academic coaching, and supplemental instruction) to students. The Library provides a first floor that encourages talking and eating to foster a welcoming and friendly atmosphere and the second floor has collaborative study rooms, our Librarians teach life-long learning, information literacy, and critical thinking skills through classroom presentations, and our institutional repository, digital commons, promotes student and faculty academic work to a global audience that is indexed in google.

*Where we are headed...*

- *Streamlining academic support services to ensure that time and money are spent in the most efficient ways that improve student success*
- *Implement a professional advising center to increase retention among freshman, sophomores, and at-risk students.*

Our faculty will be committed to their disciplines' code of ethics and our students will value and **respect the campus honor code**.

*Where we are now...* Currently the campus has an academic dishonesty policy, not an honor code. Studies have shown a relationship between rationalization for engaging in academic dishonesty

<sup>7</sup> <https://www.usnews.com/best-colleges/montana-tech-2531>

<sup>8</sup> Myers, B. A. (2016). Evaluating admission practices as potential barriers to creating equitable access to undergraduate engineering education (Doctoral dissertation, University of Colorado at Boulder).

and rationalization for engaging in unethical behavior in a workplace setting<sup>9</sup>. This relationship underscores the importance of creating an academic culture that values ethical behavior.

*Where we are headed...*

- The campus will embrace academic integrity and develop an honor code that emphasizes ethical behavior and creates a culture that makes most forms of serious cheating socially unacceptable among the majority of students.
- Faculty will embrace the student honor code by including: an honor code statement in the syllabus, an honor pledge as a front page that all students must sign before taking an exam, and consider instructor optional un-proctored exams.
- The campus will develop a non-academic student conduct code with input from student leadership.

---

<sup>9</sup> Harding, T. S., Carpenter, D. D., Finelli, C. J., & Passow, H. J. (2004). The influence of academic dishonesty on ethical decision making in the workplace: A study of engineering students. Proceedings of the ASEE Annual Conference and Exposition, Salt Lake City, UT.

## Recommendation II:

*Montana Tech will have a nationally competitive applied research culture*

Applied research seeks to answer tangible questions, to solve real-world problems, and develop innovative technologies. More than 80% of research and development in the US is applied research, yet very little applied research is done at colleges and universities<sup>10</sup>. Montana Tech has a legacy of strong applied research. Today, Montana Tech has a few pockets of successful, seeds of potentially successful, nationally competitive research programs. These include research programs in materials sciences and engineering, geosciences and geochemistry, and electric power systems.

The MUS has long recognized that “graduate students are a mainstay of research productivity in science and technology. A concerted effort to recruit, retain, and graduate the most talented graduate students from the state, region, nation, and world will pay off in research productivity and in long term, economic development - as many of these students - wherever they originated will want to pursue their careers in Montana.”<sup>11</sup> Successful research programs have a mix of MS and PhD students. PhD candidates enable depth and stability to research projects that often lack with programs only staffed with MS students. A second and fast-growing model for advanced education is non-research-based master’s degrees (e.g. Masters of Engineering). Professional graduate education in coursework only terminal degree programs that can provide a path for professional advancement, satisfy professional licensure requirements, or broaden technical knowledge. The infrastructure required to offer a quality tuition-based graduate program significantly overlaps those of a quality research program (e.g., highly qualified faculty).

The foundation of successful research and graduate programs are the faculty. We recognize our undergraduate teaching is a significant strength and desire to maintain this, but we also recognize that we must embrace a wider perspective in faculty recruitment, development, evaluation, and retention to support our research goals. Factors such as a balance between teaching and research responsibilities and lab facilities can help to attract high-quality faculty to a university<sup>12</sup>. Successful graduate programs also require a management structure that enables many necessary components such as operational policies, inter-department collaborations, inter-MUS collaborations, appropriate funding mechanisms, government and industrial relationships, and graduate student recruiting, marketing and quality control. Today, Montana Tech’s management structure primarily focuses on delivering specific undergraduate programs. While this serves to maintain the quality and consistency of those undergraduate programs, it discourages collaborations often necessary in research.

We recognize that shifting Montana Tech to have a stronger research and graduate education focus requires investments of resources and human capital, however, we also believe that if this is to be executed correctly, the fiscal costs will be captured through an increase in external funding and an increased number of graduate students. The net benefits to Tech are significant. Institutions that lead technology are educational leaders and the seed for meaningful economic development.

---

<sup>10</sup> <https://www.nsf.gov/statistics/2018/nsb20181/digest/sections/u-s-r-d-performance-and-funding>

<sup>11</sup> [https://mus.edu/research/MUS\\_STPlan\\_2015.pdf](https://mus.edu/research/MUS_STPlan_2015.pdf)

<sup>12</sup> Haley, T. R. (2008). The Lab of the Future: Building Facilities that Attract Premier Faculty and Students. *Facilities Manager*, 24(1), 30-31.

*Goals:*

Montana Tech will have several highly successful mission-focused **research focused** degree programs.

*Where we are now...* Currently, Montana Tech has 11 MS degrees, 3 graduate certificate programs, and 1 PhD degree.

*Where we are headed...*

- Every major research program will have both an MS and PhD option.
- Montana Tech will offer 4 PhD programs. We will pursue PhD collaborations within the MUS and outside the MUS. We offer the newly enacted PhD in Materials Sciences as a successful model for constructing PhD programs at Tech and within the MUS.

Montana Tech will have a number of high quality **professional graduate degrees**.

*Where we are now...* We currently offer professional Master degrees in industrial hygiene, project management, and technical communications.

*Where we are headed...* We envision offering several additional mission-focused non-research graduate degrees, including several in engineering. Many of these programs will be delivered online to capture students across the nation and world.

Montana Tech will create a culture that **values and rewards research**.

*Where we are now...* Today, the faculty culture primarily values undergraduate education. Montana Tech has a few incentive programs for research. New faculty are eligible to apply for seed grants. These grants of up to \$5,000 are intended to support new faculty members establishing research labs. Established research active faculty receive a standard one course per semester reduction in teaching. Faculty members with grants are eligible to buy out additional courses as well. Faculty members in graduate degree granting departments receive no additional workload reductions in recognition of their work with graduate students.

*Where we are headed...*

- Montana Tech will create programmatic structures to support new faculty researchers. These supports could include reduced teaching loads during the first year, startup funds, and/or mentoring programs.
- Montana Tech will investigate workload policies that recognize and reward faculty for working with graduate students and conducting research; especially funded research.
- Tenure and promotion standards, especially those for departments that grant graduate degrees, will be modified to clearly reflect a research expectation based upon national standards for the discipline.

Montana Tech will create **research centers** to enable collaborations and institutionalize funding opportunities.

*Where we are now...* Today, Montana Tech has only one active center (CAMP) that is recognized by the Board of Regents<sup>13</sup>. Research centers are shown to increase faculty productivity and to support cross-discipline and inter-institutional collaborations<sup>14</sup>.

*Where we are headed...* We will create at least three additional research center in areas like Underground Mining Education Center, geosciences, petro-sciences, and electric energy delivery. Each center will have a full-time director that will develop collaborations between Montana Tech faculty members and outside entities. Directors will also help seek funding to support the research conducted by the center.

Montana Tech will invest in **laboratory facilities** needed to sustain high profile research areas and PhD programs.

*Where we are now...* Montana Tech has outstanding and unique teaching laboratories; but, only pockets of nationally competitive research labs. For example, Montana Tech's Underground Mining Education Center (UMEC) is the only on-campus underground mine in the world dedicated to teaching.

*Where we are headed...*A component of establishing research centers will focus on research lab development. We will build on recent research investments at Tech including the underground mine, Tech's first cleanroom, and a new scanning electron microscope. We will work to expand our petro-sciences, geosciences, and power systems labs to have state-of-the-art research components.

- Develop financial models that allow us to use IDC's in the development and operation of state-of-the-art laboratories
- Develop and strengthen collaborations with National Laboratories to increase Montana Tech's competitiveness in winning research grants and placing Tech graduates in important technical fields
- Develop research collaborations within the state and the region to leverage unique capabilities to solve problems important to Montana and the regions
- Develop research collaborations with Top Tier research universities to form mutually beneficial alliances.

---

<sup>13</sup> <http://mus.edu/borpol/bor200/218-5.pdf>

<sup>14</sup> Ponomariov, B. L., & Boardman, P. C. (2010). Influencing scientists' collaboration and productivity patterns through new institutions: University research centers and scientific and technical human capital. *Research Policy*, 39(5), 613-624.

### Recommendation III:

*Our approach to curriculum will focus on integrated problem solving*

Montana Tech’s curricula and student experience will integrate team-based interdisciplinary inquiry, focused on solving problems through science, engineering, and technology. These experiences provide the creativity, knowledge, and skills that our employers desire, alumni cherish, and the state needs, and present students with opportunities to develop communication, critical thinking, cultural awareness, personal responsibility, business acumen, and other types of non-technical skills. The goal of integrating team-based interdisciplinary problems is “to ensure that students are given opportunities to tackle complex questions at every step of the way, from first to final year.”<sup>15</sup> The American Society for Engineering Education recommends that undergraduate curriculum include a few key components. These components include team-based design projects in the first year of college, having a focus on real-world impact, and exposure to industry.<sup>16</sup> Many of the practices in the report are shown to impact retention in STEM disciplines and/or later satisfactions.

At heart, all these high-impact educational practices seek to involve students in authentic learning experiences that favor open-ended problems like those encountered in the real-world. Courses that focus on practical problems create increased persistence in STEM disciplines.<sup>17</sup> Extra-curricular opportunities like internships and undergraduate research can retain students by helping them to develop a professional identity.<sup>18</sup> Even physical spaces, like makerspaces, that encourage experimentation and creativity can engage students in authentic learning.<sup>19</sup>

Montana Tech has strong experience in many of these educational practices. Many of our capstone courses include projects derived from industry, government, or the community. We offer students many different co-curricular opportunities to participate in authentic learning experiences. These include participation in undergraduate research, co-ops and/or internships; professional competitions like the “Waste-management Education Research Consortium International Design Team Competition”; and service organizations like “Engineers without borders”.

#### *Goals:*

**Capstone/senior-design projects** will be sponsored to engage students in addressing real-world, contemporary challenges

*Where we are now...* Many programs require capstone experiences that focus on solutions to real-world problems. These challenges are posed by external sponsors like the Forest Service; the Department of Energy; the Natural Heritage Program; Department of Defense; Montana

<sup>15</sup> <https://www.insidehighered.com/news/2018/01/29/colleges-share-how-they-made-their-general-education-programs-more-laundry-list>

<sup>16</sup> <https://www.asee.org/documents/publications/reports/2017TUEEPhase2.pdf>

<sup>17</sup> [https://innovation.ed.gov/files/2016/09/AIR-STEM2026\\_Report\\_2016.pdf](https://innovation.ed.gov/files/2016/09/AIR-STEM2026_Report_2016.pdf)

<sup>18</sup> Eagan, M.K. (2013). *Understanding undergraduate interventions in STEM: Insights from a national study*. Presented to the Committee on Barriers and Opportunities in Completing 2-Year and 4-Year STEM Degrees, National Academy of Sciences, Washington, DC. Available:

[http://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse\\_085900.pdf](http://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_085900.pdf) [July 2015].

<sup>19</sup> Mekolichick, J., & Wirgau, J. (2017). Leveraging the Maker Movement for Undergraduate Research: Developing a Making and Innovation Culture. *Council on Undergraduate Research Quarterly*, 37(4).

Resources; NUCOR Steel; Butte Silver Bow County; Fish, Wildlife, and Parks; Marathon Oil; ConocoPhillips; the Bureau of Land Management; DNRC; Montana Watershed Authorities; the NIH; and the NSF.

*Where we are headed...* 100% of capstone/senior-design projects will be sponsored. When possible, graduate students will help to mentor these projects.

Students will engage in **interdisciplinary team-based inquiry** beginning their first year

*Where we are now...* Some programs involve partnerships between departments such as Electrical, Mechanical, and Software Engineering's "Capstone Partnership Program;" Mining and Geological Engineering's "Mine/Geological Design Project;" and Civil Engineering's partnership program with Environmental Engineering, S.H.I.H., and Montana Bureau of Mines and Geology (MBMG). Montana Tech provides some problem-solving curriculum through first-year seminars in the majority of four-year degree programs. This is evident through specific seminars in programs like First-Year Engineering. We have very few interdisciplinary general education courses.

*Where we are headed...* 100% of students have at least one interdisciplinary experience in their first year.

Our campus will provide spaces where students, faculty, staff, and the community can engage in **collaborative problem-solving**.

*Where we are now...* We have several unique inquiry spaces on campus such as our Underground Mine Education Center and Natural Resource Research Center (NRCC).

*Where we are headed...* Infrastructure decisions will be made to provide collaborative spaces for students, faculty, and staff. These spaces will, along with technology and programming, will facilitate these collaborations for academic, research, and community endeavors.

Our students gain applied knowledge and skills through **research and internship/co-op experiences**

*Where we are now...* Not all students participate in internships or research experiences. In the 16/17 fiscal year, only 231 students reported 244 degree-related internship experiences. Whereas a larger number of students have paid research experiences through grants, MBMG, and CAMP, only 35 students participated in SURF or URP projects in 16/17. At Montana Tech's Techxpo event, students presented research or engineering solutions through 95 projects in 2015, 100 projects in 2016, and 124 projects in 2017.

*Where we are headed...*

- Every student will complete an internship or research experience through Undergraduate Research.
- Every student will present their research by participating in at least one professional conference, expo, and/or publication.

## Recommendation IV:

### *Montana Tech will grow the STEM workforce in Montana and beyond*

While four-year degrees remain an important qualification for workers in STEM, two-year and workforce education play a strong role in STEM education as well. There are a number of different fields where two-year degrees provide needed skills for entry into the STEM workforce.<sup>20</sup> Approximately 29% of the jobs in STEM fields (including health care) do not require a four-year degree.<sup>21</sup> Community Colleges, with their legacy of workforce education programs, are playing an important role in building a STEM workforce capable of meeting national needs.<sup>22</sup> Montana Tech has many two-year and certificate programs in STEM fields including Welding, Radiological Technician, Network Technology, Metals Fabrication, Automotive Technology, and the Pre-apprenticeship Line Program. We recognize the important role of two-year education in supporting the development of a strong STEM workforce.

Montana Tech recognizes our unique capacity to remove some of the typical barriers for students that wish to begin a four-year degree after completion of a two-year degree. There are not separate general education courses for two-year and four-year students. This means that two-year and four-year students take the same science, math, communications, social science, and humanities courses. This eliminates two barriers often seen by transfer students: the differences in expectations present at different institutions and the difficulty transferring courses between institutions.<sup>23</sup>

Changing enrollment patterns have created "... a complex set of student pathways for obtaining an undergraduate credential."<sup>24</sup> These complex pathways mean that students, especially those in two-year and certificate programs, are struggling to graduate on time.<sup>25</sup> Colleges across the US are helping to ensure timely-graduation via structured scheduling<sup>26</sup> and degree pathways<sup>27</sup> that help students move more seamlessly between related programs.

The physical space and organizational structure of the institution will **remove barriers** for timely completion of degrees.

*Where we are now...* Currently all of Montana Tech's two-year programs are part of Highlands College and are housed at a separate facility. The facility is located ten miles south of the main campus. The Highlands college facility has no space for wet labs. Consequently, students that are part of a two-year or certificate program must travel to the main campus to take courses in

<sup>20</sup> <https://blog.dol.gov/2016/07/28/get-a-stem-job-with-less-than-a-4-year-degree>

<sup>21</sup> <http://lmi.mt.gov/Portals/193/Publications/LMI-Pubs/Articles/2016/1016-STEMjobs.pdf>

<sup>22</sup> National Academies of Sciences, Engineering, and Medicine. (2016). *Developing a national STEM workforce strategy: A workshop summary*. National Academies Press.

<sup>23</sup> Townsend, B. K. (2008). "Feeling like a freshman again": The transfer student transition. *New Directions for Higher Education*, 2008(144), 69-77.

<sup>24</sup> National Academies of Sciences, Engineering, and Medicine. (2016). *Barriers and opportunities for 2-year and 4-year stem degrees: systemic change to support students' diverse pathways*. National Academies Press.

<sup>25</sup> Complete College America. (2014). *Four-Year Myth: Make College More Affordable, Restore the Promise of Graduating on Time*. Indianapolis, IN: Complete College America.

<sup>26</sup> <https://ccrc.tc.columbia.edu/media/k2/attachments/building-guided-pathways-community-college-student-success.pdf>

<sup>27</sup> <https://ccrc.tc.columbia.edu/media/k2/attachments/guided-pathways-part-3-timeline-tips.pdf>

Biology, Physics, and Chemistry. In addition, our current schedule is not structured to facilitate student travel between the two campuses. The combination of the physical separation with the scheduling means that students have barriers to completing their degree programs in a timely fashion. Our current organization structure means that related two-year programs and four-year programs often have separate department heads and are supervised by different deans. There means that there is often very little alignment between the requirements for related two- and four-year degrees. Students who wish to change from a two-year to a four-year program or from a four-year to a two-year program often need to take extra courses to satisfy degree requirements. This factor also impedes timely degree completion.

*Where we are headed...*

- Related two- and four-year programs will be more closely aligned to facilitate timely degree completion.
- Programs will be reorganized within and between colleges to create stronger pathways for students transitioning between two- and four-year programs.
- Scheduling and physical space use will be intentional and ensure that students in all degree programs can complete their courses on time.

Montana Tech will ensure that Montana students continue to have access to an **affordable education**.

*Where we are now...*In 2017, the Montana Tech Foundation launched the “Be the First” Initiative.<sup>28</sup>

This Initiative supports first-generation college students with financial need that live in the Butte area. In 2018, Montana Tech awarded \_\_\_ in scholarships. Only \_\_\_ were awarded to students in two-year degree program. There are very few institutional scholarships that two-year students are qualified to receive. Students that move into a four-year program from a two-year program have an additional barrier when applying for continuing student scholarships. Currently all courses taken while the student was enrolled in a two-year program are treated as transfer courses and do not count towards the student’s GPA. This means that students in these programs are not able to meet the GPA requirement for continuing student scholarships.

*Where we are headed...*

- All Montana Tech students will have a single transcript.
- The Montana Tech Foundation will continue to seek donations for scholarships that help Montana students in all degree programs afford an education.
- A tuition structure will be created that will maintain affordability for Montana students while still supporting a world-class education.

---

<sup>28</sup> [https://mtstandard.com/news/local/new-initiative-grants-full-scholarships-to-montana-tech-to-local/article\\_85dbdb30-12b1-551f-87a4-003d2e07a421.html](https://mtstandard.com/news/local/new-initiative-grants-full-scholarships-to-montana-tech-to-local/article_85dbdb30-12b1-551f-87a4-003d2e07a421.html)

## Proposed Timeline

### By the end of FY 2019 –

- Work with faculty and students to develop a student Honor Code
- Create an Office of Faculty and Staff Development and Instructional Design: This office will support the analysis of general education program, development of interdisciplinary coursework, and design assessments that measure both technical and soft skills.
- Reorganize the management structure of the institution to encourage both instructional and research collaboration and facilitate pathways for students from Associate to Bachelor degrees
- Create a unified transcript for all work done by students while at Montana Tech.
- Create a tuition structure that supports a world-class education while also maintaining affordability for Montana students.

### Within 1 year –

- The reporting line of the Chancellor will be at the Commissioner level and the title changed to President: Tenure and promotion applications, employment approvals, and funding approvals will be routed directly to the Commissioner for OCHE and/or for consideration by the Regents
- Launch Master of Engineering degree
- Launch MS in Materials Science and Engineering degree
- Pilot interdisciplinary problem-based courses for first year students
- Incorporate either research or internship experiences in four-year programs that don't already have them and establish student outcomes across programs for these experiences
- Hire an independent consultant to create a space plan and space approval process: This physical reorganization will support creation and allocation of spaces for both teaching and research
- Review results from Program Prioritization and begin analyzing the organizational and management structure

### Within 5 years -

- Implement student honor code
- Integrate discipline specific code of ethics into curriculum
- Office of Faculty and Staff Development and Instructional design begins offering instructional design workshops
- PhD in Material Science expanded to PhD in Materials Science Engineering
- Creation of two additional PhD programs
- Master of Engineering program in operation with 2-3 options/concentrations highly enrolled (at least 20 FTE)
- Two additional research centers are operational
- Create an accessible portal (web and physical) that identifies and curates capstone challenges, cultivates monetary sponsors and liaisons with clients, industry executives, and granting agencies
- Revise the workload policies for faculty: This revision should incorporate supervision of graduate students and teaching interdisciplinary first-year or senior design courses

- All programs incorporate a team-based problem-solving course in their first-year curricula and in their senior capstone
- Review/revise the General Education program
- Work to streamline curricula in related disciplines in order to facilitate transitions between two- and four-year degree programs

Within 10 years –

- Four total PhD programs operational
- Four research centers operational
- \$20 million in sponsored program funding annually received

DRAFT