DATE: February 5, 2014

TO: Chief Academic Officers, Montana University System

FROM: Neil Moisey, Deputy Commissioner for Academic, Research, & Student Affairs
John Cech, Deputy Commissioner for Two-Year & Community College Education

RE: Level II Submission Items

The campuses of the Montana University System have proposed new academic programs or changes under the Level II approval process authorized by the Montana Board of Regents. The Level II proposals are being sent to you for your review and approval. If you have concerns about a particular proposal, you should share those concerns with your colleagues at that institution and try to come to some understanding. If you cannot resolve your concerns, you need to raise those concerns at the Chief Academic Officer's conference call on **February 12, 2014**. Issues not resolved at that meeting should be submitted in writing to OCHE by noon on **Friday, February 14th (Friday following CAO call)**. That notification should be directed to Amber Dullum, Assistant to the Deputy Commissioners. If Amber does not hear from you, in writing, by **noon on February 14th**, OCHE will assume that the proposals have your approval.

The Level II submissions are as follows:

Gallatin College MSU:

- Request for Authorization to Create a Certificate of Applied Science in Computer Numerically Controlled Machining ITEM #162-2011-R0314|Level II Request Form| Curriculum Proposal Form

Helena College- University of Montana

- Request to Establish Associate of Applied Science in combination with a Sheet Metal Apprenticeship Program ITEM #162-1901-R01314 | Level II Request Form | Curriculum Proposal Form | Attachment #1 | Attachment #2 | Attachment #3 µ !ǘǘl·ǑKΥŜyǘ Iп

March 6-7, 2014

ITEM 162-2011-R0314

Request for Authorization to Create a Certificate of Applied Science in Computer Numerically Controlled Machining

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THAT

The Board of Regents authorizes Gallatin College MSU to offer a 32 credit Certificate of Applied Science (CAS) in Computer Numerically Controlled (CNC) Machining.

EXPLANATION

This CAS will prepare students to apply technical knowledge and skills to operate computer numerically controlled (CNC) machines, such as lathes, mills, precision measuring tools, and related attachments and accessories, to perform machining functions, such as cutting, drilling, shaping, and finishing products and component parts. This CAS includes instruction in CNC terminology, setup, programming, operations, and troubleshooting; blueprint reading; machining; lathe and mill operations; technical mathematics; computer literacy; CAD/CAM systems; shop and safety practices; equipment capabilities; and regulations and laws. This program proposal is a piece of the Trade Adjustment Assistance-Community College and Career Training (TAACCCT) grant that was awarded to a statewide consortium. The startup cost for this new program will be covered for 3 years by TAACCCT grant funding. This will be a 32 credit certificate of applied science that is designed to be completed in two semesters.

ATTACHMENTS

Level II Request Form
Curriculum Proposal Form

Item Number: **162-2011-R0314** Meeting Date: **March 6-7, 2014**

Institution: **Gallatin College MSU** CIP Code: **48.0510**

Program Title: **Computer Numerically Controlled (CNC) Machining Certificate of Applied Science**

Level II proposals require approval by the Board of Regents.

Level II action requested ***(place an X for all that apply and submit with completed Curriculum Proposals Form):***

Level II proposals entail substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination of personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other campuses within the Montana University System and community colleges. Board policy 303.1 indicates the curricular proposals in this category:

___ **1. Change names of degrees (e.g. from B.A. to B.F.A.)**

_X_ **2. Implement a new minor or certificate where there is no major or no option in a major;**

___ **3. Establish new degrees and add majors to existing degrees; and**

___ **4. Any other changes in governance and organization as described in Board of Regents' Policy 218, such as formation, elimination or consolidation of a college, division, school, department, institute, bureau, center, station, laboratory, or similar unit.**

Specify Request:

Gallatin College is applying to offer a CNC Machining Certificate of Applied Science. This will be a 32 credit certificate of applied science that is designed to be completed in two semesters. This CAS will prepare students to apply technical knowledge and skills to operate computer numerically controlled (CNC) machines, such as lathes, mills, precision measuring tools, and related attachments and accessories, to perform machining functions, such as cutting, drilling, shaping, and finishing products and component parts. This CSA includes instruction in CNC terminology, setup, programming, operations, and troubleshooting; blueprint reading; machining; lathe and mill operations; technical mathematics; computer literacy; CAD/CAM systems; shop and safety practices; equipment capabilities; and regulations and laws. This program proposal is a piece of the TAACCCT grant that was awarded to a statewide consortium. The startup cost for this new program will be covered for 3 years by TAACCCT grant funding.

1. Overview

In the fall of 2013 Gallatin College, along with 12 other 2 year colleges, received a Trade Adjustment Assistance-Community College and Career Training (TAACCCT) grant. The statewide consortium name of this project is Strengthening Workforce Alignment in Montana's Manufacturing and Energy Industries (SWAMMEI). Gallatin College will use their grant funding to start and operate a Computer Numerically Controlled (CNC) Machining Program.

2. Provide a one paragraph description of the proposed program. Be specific about what degree, major, minor or option is sought.

Gallatin College is applying to offer a Computer Numerically Controlled (CNC) Machining Certificate of Applied Science. This will be a 32 credit certificate of applied science that is designed to be completed in two semesters. This CAS will prepare students to apply technical knowledge and skills to operate computer numerically controlled (CNC) machines, such as lathes, mills, precision measuring tools, and related attachments and accessories, to perform machining functions, such as cutting, drilling, shaping, and finishing products and component parts. This CAS includes instruction in CNC terminology, setup, programming, operations, and troubleshooting; blueprint reading; machining; lathe and mill operations; technical mathematics; computer literacy; CAD/CAM systems; shop and safety practices; equipment capabilities; and regulations and laws.

3. Need

A. To what specific need is the institution responding in developing the proposed program?

Gallatin College applied for, and was awarded, a second round TAACCCT grant with a focus on a set of interconnected, stackable credential training programs directed toward developing workers for northwest Montana's advanced manufacturing industry. Our process included the development of an industry advisory committee to provide insight into educational needs within the local manufacturing industry. This advisory committee included representatives from 5 different machining businesses. There were robust discussions aimed at identifying competency voids in the local workforce, and then how to design training programs and curriculum that would effectively address those voids.

In 2012 Gallatin and Park counties accounted for 15% of the state's total manufacturing employment, which makes this region one of the top 3 manufacturing areas in the state. "Gallatin County's manufacturing companies employed 2,702 people in 2011 with reported earnings of $123 million. "Manufacturing made up 18% of the Gallatin County economic base during 2011-2013, 11% of that was in metals, 3% plastic and rubber, and 9% in minerals. Local employers have expressed "an on-going need for highly skilled computer-operated machinery workers." Machine technology and computer numeric controlled (CNC) machine technology are

in demand in Gallatin Valley. These are highly skilled jobs, paying between $30,380 up to $57,420 a year within the Gallatin Valley, and require expertise and training beyond on the job training.

At the state level manufacturing is projected to remain steady or increase as reported by Montana manufacturers.[5] Specifically for Gallatin and Park counties, from March 2013 through June 2013, there were 42 production jobs listed. Of those 42 listings 18 were openings that required the skills and training that will be acquired in a CNC Machine program. In preparation for the TAACCCT grant Gallatin College surveyed five local machine shops. They were asked how many CNC Machinist openings they would have i n the next four years. They reported they would have a total of 67 openings in the next four years and the stated range of salary for those openings was $30,380 up to $57,420.

In the 2011 Gallatin College Workforce Needs Assessment forty two percent of the surveyed high school students reported they would be interested in a career in manufacturing. Students from the Gallatin College Design Drafting and the Welding program have also shown an interest in completing this one year certificate.

National and State data also validates projected growth for CNC machinist.

CNC Machinist SOC 51-9199, 51-9195, 51-4041, 51-4011, 51-4012, 51-4031, 51-4032,51-4033,51-4034, 51-9041, 51-4199	Wage	Projected Job Growth 201-2020
National Data	$ 38,522 per year $18.52 per hour	10.8% increase
State	$18.56	18.6% increase

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Other Sources for above section: Outlook 2013." Bureau of Business and Economic Research, University of Montana. www.bber.umt.edu, BEA-REIS; Census Bureau; and BBER estimates, Gallatin College 2011 Analysis of Workforce Needs", Gallatin College MSU, "Gallatin College 2011 Analysis of Workforce Needs", Gallatin College MSU. Local employer survey, Polzin, Paul. "The State of Montana Manufacturing" Bureau of Business and Economic Research, The University of Montana. www.bber.umt.edu, Labor/Insight (Burning Glass Technologies)

B. How will students and any other affected constituencies be served by the proposed program?

Offering a new Gallatin College program in CNC Machining will provide students with another avenue of post-secondary education that they can attain locally. This CAS will provide the skills and training necessary to attain a good paying job that is in high demand. The summer of 2013 Gallatin College asked machine shops if they needed additional CNC machine operators and technicians. Five CNC machine shops reported back that in the next 4 years they would be hiring 67 new CNC machine operators to keep up with their work load. They also reported that adding new employees would allow them to grow their business.

C. What is the anticipated demand for the program? How was this determined?

Currently Gallatin College's welding program has a waiting list, offering another option for those welding students either while they wait for welding to open or in addition to welding would be a compatible educational offering. This high number of welding students is a good indication that there will be students interested in this program. As stated in questions 3A and 3B there is a need from employers to hire students with this level of certification. Employers have also said they have employees that they would send to the program for the certificate. As mentioned above a survey of local high school students revealed that forty two percent of surveyed students would be interested in manufacturing.

4. Institutional and System Fit

A. What is the connection between the proposed program and existing programs at the institution?

Currently Gallatin College is offering a Design Drafting and a Welding program; some design drafters have expressed a strong interest in non-building design. Working and learning about design work that machine shops produce. Welders also are interested in continuing their education on product creation utilizing different materials and tools. Incorporating the CNC machining grogram into Gallatin College will allow either welders or design drafters to take that next step into production.

Engineering and CNC Machining go hand in hand. Engineers offer the design work and CNC machinist bring the design to life by building it.

B. Will approval of the proposed program require changes to any existing programs at the institution? If so, please describe.

No.

C. Describe what differentiates this program from other, closely related programs at the institution (if appropriate).

There are no other closely related programs at this institution.

D. How does the proposed program serve to advance the strategic goals of the institution?

Gallatin College operates under the MSU Strategic plan and the Comprehensive Two-Year Mission Plan for Gallatin College. Below are the MSU strategic plan metrics that this program will contribute towards.

In the MSU Strategic Plan 2012 **Metric L.2.3:** states that "By 2019, the number of associate degrees conferred will increase from 38 to 70 per year. Workforce certificates conferred will increase from 35 to 65 per year." By offering additional workforce certificate opportunities and utilizing community partners that will support those certificates with student referrals, this program should increase the number of certificates conferred.

Metric L.3.1: "By 2019, the percent of graduates employed full time in their field or in positions of their choosing will increase from an average of 62 percent to 70 percent. By offering another option for students that are focused on targeted employment opportunities students should be able to better fulfill their employment goals.

Metric A.1.5: "By 2019, the number of students enrolled in Gallatin College degree and certificate programs will double to 400." By offering another certificate option to our community we should attract another variety of students, perhaps that we haven't been able to recruit before. If Gallatin College is going to double the amount of students attending more certificates must be added so students can maintain workforce diversity for the local economy.

Metric A.2.4: "By 2019, the number of nontraditional students enrolled in MSU undergraduate and Gallatin College programs will increase to 3,200 (a 20 percent increase)." Gallatin College hopes that by offering this CNC Machining CAS more non-traditional students will have the opportunity to attend college.

Gallatin College also operates under a Two-Year Comprehensive Mission Expansion Plan. By adding the CNC Machining CAS the following numbered initiatives will be addressed and responses to these can be found in above metric answers.

1. Enrollment and program growth;

5. Develop industry partnerships and meet local workforce demand;

6. Expand short-term workforce training;

8. Prepare students to be career ready.

E. Describe the relationship between the proposed program and any similar programs within the Montana University System. In cases of substantial duplication, explain the need for the proposed program at an additional institution. Describe any efforts that were made to collaborate with these similar programs; and if no efforts were made, explain why. If articulation or transfer agreements have been developed for the substantially duplicated programs, please include the agreement(s) as part of the documentation.

This program was designed in collaboration with a statewide consortium. The consortium consisted of 12 other 2 year institutions across the state. The consortium spent the summer of 2013 writing the grant and in the grant addressed ways to alleviate statewide workforce needs. This program was identified as a statewide and local workforce need that could be addressed by Gallatin College.

5. Program Details

A. Provide a detailed description of the proposed curriculum. Where possible, present the information in the form intended to appear in the catalog or other publications. NOTE: In the case of two-year degree programs and certificates of applied science, the curriculum should include enough detail to determine if the characteristics set out in Regents' Policy 301.12 have been met.

Fall	Credits	Spring	
M111: Technical Math	**3**	**COMX 102- Interpersonal Communication in the Workplace**	**1**
MCH 120 Blueprint Reading	**2**	**WRIT 104- Workplace Communications**	**2**
MCH 130 – Machine Shop	**3**	**MCH 232- CNC Turning Programming and Operations Level 2**	**3**
MCH 231-CNC Turning Operations Level 1	**3**	**MCH 235- CNC Milling Programming and Operations Level 2**	**3**

MCH 234- CNC Milling Operations Level 1	**3**	**MCH 230- Tooling and Fixtures Used in CNC**	**2**
MCH 103 Intro to Computer Aided	**2**	**MCH 104 Computer Aided Manufacturing**	**2**
Manufacturing Level I- Online Immerse 2learn		**Level II-Online Immerse 2 learn**	
		MCH 122- Introduction to MASTERCAM	**3**
Total	**16**		**16**

M 111 Technical Mathematics

- Utilize and apply mathematical operations, measurement (English and Metric Systems), introductory geometric principles and applied algebra into technical applications in academic and workplace situations;
- Read, interpret, and produce solutions to applications at the introductory technical mathematics level;
- Apply ratio and proportion concepts to introductory technical mathematical situations;
- Apply appropriate technology in a mathematical situation;
- Determine the validity of results and data;
- Solve any component of a right triangle with any two components given.

MCH 120: Blueprint Reading : 2Cr

- Recognize blueprints as a primary form of communication in the machinist trade.
- Interpret and understand all information provided on a standard blueprint.
- Construct an adequate working drawing for use in the shop.
- Identify lines used in industry.
- Use orthographic projection to read prints.
- Identify sectional and auxiliary views including broken out, full, half, rotated, removed, and assembly sectioning practices.
- Identify in-line and baseline dimensioning practices.
- Perform tolerance practices for radii, angles, chamfers, holes, threads, and tapers.
- Read and identify symbols for geometric dimensioning and tolerancing.
- Identify abbreviations on prints.
- Practice good sketching techniques.

MCH 130 Machine Shop: 3

- Identify and properly use hand and measuring tools in a safe manner.
- Use proper set-up and operation of drill presses.
- Properly sharpen, care for and use cutting tools such as drills, taps, dies, reamers and basic hand tools.
- Measure properly using tapes, rules, and venires.

- Use proper procedures in set-up and operation of the pedestal grinders.
- Employ proper procedures in the use of layout equipment such as venire height gage, surface gage, scribes, and assorted layout blocks.
- Demonstrate safe and proper use of hand tools such as files, hacksaws, chisels, scribes, punches, etc.
- Demonstrate proper use of taps, dies, helicoils, and threaded inserts.
- Given various jobs, students will set-up and use precision layout tools such as surface gage, layout table, height gage, etc.
- Demonstrate how to properly sharpen drill bits, lathe tools, chisels, screwdrivers, punches, etc.
- Explain and demonstrate proper care, safety, and maintenance of bench and pedestal grinders.
- Set-up and properly use the drill press and radial arm drill press in accordance with operation manuals.
- Identify and demonstrate proper procedures in using a center drill, countersink, counter bore, and reamers.

MCH 231 CNC Turning Operations Level 1

- Perform start-up procedures and maintenance.
- Demonstrate tasks related to set-up & operation.
- Utilize CNC Control / Operator Panel buttons and switches.
- MDI Programmable Machine Functions.
- Exhibit knowledge of CNC Modes of Operation.
- Exhibit CNC Safe Operating Procedures.
- Demonstrate Speed & Feed Relationships & Manipulation.
- Operations used to manufacture piece parts.
- Understand Tool Offset Concepts – Lengths, Diameters & Wear.
- Perform Work & Fixture Offsets.
- Understand the use and modification of Cutter Compensation.
- Perform Program Editing Procedures.
- Understand expectations of Operator Edits (PGM & COMP values).
- Recognize Basic Program Structure from an Operators Viewpoint.
- Perform Program Verification.

MCH 234 CNC Milling Operations Level 1

- Perform start-up procedures and maintenance.
- Utilize tasks related to set-up & operation.
- Operate "CNC Operator Panel" buttons and switches.
- MDI Programmable Machine Functions.
- Exhibit knowledge of CNC Modes of Operation.
- Exhibit CNC Safe Operating Procedures.
- Demonstrate Speed & Feed Relationships & Manipulation.
- Operations used to manufacture piece parts.
- Understand Tool Offset Concepts – Lengths, Diameters & Wear.
- Perform Work & Fixture Offsets.
- Understand the use and modification of Cutter Compensation.
- Perform Program Editing Procedures.
- Understand expectations of Operator Edits (PGM & COMP values).
- Recognize Basic Program Structure from an Operators Viewpoint.

- Perform Program Verification

MCH 103 Intro to Computer Aided Manufacturing Level I: Immerse 2Learn online component Semester 1: 2CR

- Demonstrate understanding of basic safety rules of a CNC manufacturing facility.
- Demonstrate proficiency in shop math level 1 and 2
- Complete the basic introduction to the Haas VF-Series Milling Machine and GUI Control setup.
- Use tools and equipment to form and shape various materials in a manufacturing laboratory environment;
- Discuss processes necessary to cast and mold materials in a manufacturing laboratory environment;
- Use tools and equipment to machine various materials;
- Safely operate basic machinery and equipment.

COMX 102 Interpersonal Communication in the Workplace

- Understand the key elements of the communication process;
- Identify the elements of nonverbal and verbal communication and explain their significance in the communication process;
- Describe appropriate business ethics and professional courtesy;
- Identify practical skills geared toward improving communication in the workplace;
- Practice skills in listening reflectively, attentively, and more empathetically

WRIT 104 Workplace Communications

- Determine audience, purpose, and topic for workplace writing tasks;
- Develop skills in prewriting, organizing, drafting, editing and revising documents;
- Produce and edit short technical documents such as instructions, memos, and incident reports;
- Demonstrate basic competency in the use of grammar, syntax, punctuation, spelling, and mechanics;
- Design and evaluate documents in order to clearly and effectively communicate the message to the intended audience;
- Demonstrate the ability to work individually and in small groups to produce written documents

MCH 232 CNC Turning Programming and Operations Level 2

- Exhibit knowledge of coordinate systems used on the CNC Turning Center through their awareness of zero assignments, their relativity to one another and various codes and methods utilized.
- Demonstrate a firm understanding of absolute / incremental coordinates.
- Exhibit knowledge of program structure and steps to writing a program.
- Utilize safety lines in their programs.
- Verify their programs using various machine operation methods.
- Exhibit conscientiousness while performing program verification.
- Exhibit an understanding of canned cycles.
- Exhibit an understanding of compensation types and usages.
- Exhibit documentation for their programs.
- Demonstrate ability to visualize the execution of programmed motion.

MCH 235 CNC Milling Programming and Operations Level 2

- Exhibit knowledge of coordinate systems used on the CNC Machining Center through their awareness of zero assignments, their relativity to one another and various codes and methods utilized.
- Demonstrate a firm understanding of absolute / incremental coordinates.
- Exhibit knowledge of program structure and steps to writing a program.
- Utilize safety lines in their programs.
- Verify their programs using various machine operation methods.
- Exhibit conscientiousness while performing program verification.
- Exhibit an understanding of canned cycles.
- Exhibit an understanding of compensation types and usages.
- Exhibit documentation for their programs.
- Demonstrate ability to visualize the execution of programmed motion.

MCH 230 Tooling and Fixtures Used in CNC

- Exhibit knowledge of various cutting tool types and work holding methods.
- Demonstrate an ability to calculate proper speeds and feeds per recommendations.
- Recognize limits regarding the machine tool, cutting tool, set-up and material being cut.
- Understand the various cutting tool materials used in manufacturing.
- Exhibit knowledge of carbide insert numbering system.

MCH 122 Introduction to MASTERCAM: 3

- Exhibit a working knowledge of Mastercam's primary functions as a computer aided machining software.
- To work from typical engineering blueprint; drafts within Mastercam and from those designs create toolpaths for CNC milling machines and CNC turning machines.
- Demonstrate the ability to use Mastercam's post processor capability to write G-code for standard CNC mills and lathes.
- Use the virtual rendering capabilities of Mastercam (Backplot) to verify toolpaths before post processing and before machining on both lathes and mills.
- Create simple Solid models in Mastercam and create toolpaths from them.
- Demonstrate the use of Mastercam's Work coordinate system (WCS), Construction Planes and various coordinate planes to create multiple machining operations on the same part.
- Demonstrate the engraving functions.
- Create tool libraries in Mastercam that relate to actual tooling used in mills and lathes.
- Demonstrate the ability to import CAD solid models in to Mastercam , orientate the part model and define Work Coordiante Systems and apply a manufacturing plan to efficiently machine lathe and mill parts.
- Import and create tooling, fixturing and other machine components to the machining plan, especially to verify correct machining in Backplot feature of Mastercam.

104 Intro to Computer Aided Manufacturing Level II: Immerse 2Learn online component Semester 2: 2CR

- Demonstrate ability in reading manufacturing blueprints.
- Use precision measuring tools.
- Create speeds and feeds calculations for turning, milling and drilling.
- Complete the basic introduction to the Haas CNC lathe control.

- Use the Haas Intuitive Programming System to write a program for a lathe. This program can edited and save to memory.
- Reinforce safety while using machinery

B. Describe the planned implementation of the proposed program, including estimates of numbers of students at each stage.

Fall 2014	Spring 2015	Fall 2015	Spring 2016	Fall 2016	Spring 2017
All fall courses offered.	All spring courses offered.	All fall courses offered.	All spring courses offered.	All fall courses offered.	All spring courses offered.
10 students	10	15	15	20	20

6. Resources

A. Will additional faculty resources be required to implement this program? If yes, please describe the need and indicate the plan for meeting this need.

Classroom and Lab Space: TAACCCT grant funds will be used for the first 3 years to lease a new off-campus space that will include a lab space for the hands on machining courses, a computer lab and a classroom. This new space has been located and the lease is being reviewed by the BOR during the January meeting.

Equipment: TAACCCT grant resources are also being used to purchase the startup equipment and the materials needed for the program.

Instructional Staffing: TAACCCT grant resources are being used for the first 3 years to pay for the Program Director that will carry a six credit instructing responsibility per semester. TAACCCT grant funds will also pay for an adjunct that will be responsible for a six credits per semester. Gallatin College will pay for eight credits of instructional hours that are not covered by the grant. In addition to instructional staff, the TAACCCT grant will cover the cost of a .25FTE student success coordinator for machining and welding students and a .5 FTE faculty and grant support position.

B. Are other, additional resources required to ensure the success of the proposed program? If yes, please describe the need and indicate the plan for meeting this need.

For the next three years all resource for the startup of this program, with the exception of the eight credits of adjunct hours, are being covered by the TAACCCT grant.

7. Assessment

How will the success of the program be measured?

The first indicator of success will be based on student enrollment; Gallatin College courses will require at least 10-12 enrolled students by year two. Year three should have 15-18 students in the new courses. If

level of growth is not occurring then continuation of the course will be evaluated.

Second, third and fourth measurements will be retention, completion and job placement numbers. The final measurement of success will be industry specific credentials that our students receive. This program will incorporate the testing of Haas Level I certification and Hass Level 2 certification.

Measurement	2014-2015	2015-2016	2016-2017	Targets
# Enrolled students	10	15	20	15 students/class
Retention	8	12	16	82%
Completion	7	10	14	70%
Job Placement	6	8	11	80%
Industry Certification	4	4	6	50% of completers will receive certification.

8. Process Leading to Submission

Describe the process of developing and approving the proposed program. Indicate, where appropriate, involvement by faculty, students, community members, potential employers, accrediting agencies, etc.

This CNC Machining Program was identified as a high demand workforce need by local employers in "Opportunities Ahead: 2011 Analysis of Workforce Needs Gallatin Valley" a report developed for Gallatin College. The summer of 2013 Gallatin College met with five local machine shops of varying size and production. These industry leaders strongly encouraged that Gallatin College participate in the TAACCCT grant and implement a CNC Machine program and these employers committed to hiring 67 g r a d u a t e s over the next four years. In the fall of 2013 the TAACCCT grant was awarded and work began on developing the curriculum for a CNC Machining program. Local industry professionals, faculty from other two year institutions, and MSU College of Engineering, Mechanical and Engineering Technology Program faculty assisted with program development. In addition to these employers and faculty, students in welding and design drafting have expressed an interest in this program.

This program will be reviewed by the MSU Curriculum and Programs Committee, Faculty Senate and the Deans Council at MSU. Then the review process moves to the Board of Regents, after the Board of Regents approval, the accreditation and gainful employment review will occur.

March 6-7, 2014

ITEM 162-1901-R0314

Request to establish a new Associate of Applied Science Degree in combination with a Sheet Metal Apprenticeship Program; Helena College

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THAT

The Board of Regents or Higher Education and the State of Montana authorizes Helena College University of Montana to establish a Sheet Metal Apprenticeship program with an Associate of Applied Science Degree.

EXPLANATION

Helena College University of Montana in association with the State of Montana Department of Labor requests approval to establish a Sheet Metal Apprenticeship Program that will result in an Associate of Applied Science degree as well as a Journeyman Level Sheet Metal Worker status. This program will be overseen by the Trades Division at Helena College. There is currently not a non-union program available for sheet metal workers in the State of Montana and all students interested in this trade who do not wish to participate in a Union program are required to participate in Distance Learning through a trade school in North Dakota. There is established need for skilled sheet metal apprentices in Montana and these students should be offered the opportunity to attend a Montana school to avoid out of state tuition costs. According to the Research and Analysis Bureau of the Montana Department of Labor and Industry in Montana, employment for sheet metal workers is projected to grow much faster than the statewide average for all occupations through 2016. The Bureau also states that, "The demand for sheet metal installations will increase as more industrial, commercial, and residential structures are built. Job growth should also be boosted by the demand for energy-efficient heating and cooling systems." This is an opportunity for Helena College to be the pioneer college for a program of this type. The State of Montana Department of Labor and Industry as well as local and neighboring businesses have offered their support of such a program.

ATTACHMENTS

Level II Request Form
Curriculum Proposal Form
Attachment #1 – OJT Hours / Credits
Attachment #2 – OJT Field Requirements
Attachment #3 – Letter of Support-DLI
Attachment #4 –Letter of Support-Gov

Item Number: **162-1901-R0314** Meeting Date: **March 6-7, 2014**

Institution: **Helena College University of Montana** CIP Code: **48.0506**

Program Title: **Sheet Metal Apprenticeship**

Level II proposals require approval by the Board of Regents.

Level II action requested ***(place an X for all that apply and submit with completed Curriculum Proposals Form):***

Level II proposals entail substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination of personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other campuses within the Montana University System and community colleges. Board policy 303.1 indicates the curricular proposals in this category:

___ **1. Change names of degrees (e.g. from B.A. to B.F.A.)**

___ **2. Implement a new minor or certificate where there is no major or no option in a major;**

X **3. Establish new degrees and add majors to existing degrees; and**

___ **4. Any other changes in governance and organization as described in Board of Regents' Policy 218, such as formation, elimination or consolidation of a college, division, school, department, institute, bureau, center, station, laboratory, or similar unit.**

Specify Request:

This request is in regard to a proposal for creation of a new Associate of Applied Science Degree in association with an apprenticeship approved by the State of Montana Apprenticeship Program. This program will provide students the opportunity to work in the field and receive training from Helena College over a four year period resulting in simultaneous award of an Associated of Applied Science Degree as well as a Journeyman Sheet Metal Worker status.

1. Overview

Apprenticeship Program Sheet Metal Worker

Students completing this program of study will work in the construction industry fabricating, assembling, installing, and repairing sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes sheet metal duct installers who install prefabricated sheet metal ducts used for heating, air conditioning, or other purposes.

Sample of reported job titles: Sheet Metal Mechanic; Sheet Metal Worker; Journeyman Sheet Metal Worker; HVAC Sheet Metal Installer (Heating, Ventilation, and Air Conditioning Sheet Metal Installer); Sheet Metal Apprentice; Field Installer; Sheet Metal Fabricator; Heating, Ventilation, Air Conditioning - Refrigeration Technician (HVAC-R Technician); HVAC Technician (Heating, Ventilation, and Air Conditioning Technician); Sheet Metal Installer

Upon successful completion of the apprenticeship training program, students will be able to:

1. Apply theory as it relates to trade competencies.
2. Determine project requirements, including scope, assembly sequences, and required methods and materials, according to blueprints, drawings, and written or verbal instructions.
3. Lay out, measure, and mark dimensions and reference lines on material, such as roofing panels, according to drawings or templates, using calculators, scribes, dividers, squares, and rulers.
4. Fasten seams or joints together with welds, bolts, cement, rivets, solder, caulks, metal drive clips, or bonds to assemble components into products or to repair sheet metal items.
5. Install assemblies, such as flashing, pipes, tubes, heating and air conditioning ducts, furnace casings, rain gutters, or downspouts in supportive frameworks.
6. Convert blueprints into shop drawings to be followed in the construction or assembly of sheet metal products.
7. Fabricate or alter parts at construction sites, using shears, hammers, punches, or drills.
8. Select gauges or types of sheet metal or nonmetallic material, according to product specifications.
9. Maneuver completed units into position for installation, and anchor the units.
10. Transport prefabricated parts to construction sites for assembly and installation.
11. Drill and punch holes in metal, for screws, bolts, and rivets.

2. Provide a one paragraph description of the proposed program. Be specific about what degree, major, minor or option is sought.

This apprenticeship program is designed to prepare students as sheet metal workers, fabricating, conducting layout and installing sheet metal products. The apprenticeship agreement between Montana Department of Labor and Industry Apprenticeship and Training combines both the on-the-job experience and classroom related training instruction over a period of four years. A minimum of 144 hours of related training per year is included.

3. Need

A. To what specific need is the institution responding in developing the proposed program?

Registered apprenticeship is an important resource for employers and an opportunity for workers in these demanding times. In the environment of "downsizing" and "right sizing" the workforce must be more efficient and productive. The better we prepare Montana's future workforce today, the more likely they will be up to meeting the challenges of tomorrow's workplace.

As the existing seasoned workforce ages, the availability of skilled workers declines. Given the shrinking labor pool, a portion of job applicants may not have the skills necessary to match those of current openings in the job market. The proposed Helena College Apprenticeship and Training Program, approved through the Montana Department of Labor and Industry, helps fill this void through services provided to Montana employers.

Through a registered apprenticeship program, employers can get professional assistance to train their workers to become highly skilled in their occupational trade, or craft. As our state economy becomes more service-based, the demand for a technically trained, skilled workforce will increase.

B. How will students and any other affected constituencies be served by the proposed program?

20 new students per year

Example:

Year one	20 new students per year
Year two	15 students year one students(accounting for attrition) 20 new students
Year three	15 year two students 20 new students
Year four	15 year three students 20 new students
Total students in the program at year four	20+15+15+15 = 65 students

C. What is the anticipated demand for the program? How was this determined?

Verified demand for this state-based apprenticeship program is high. Currently, potential sheet metal apprentices enroll in correspondence and/or online study from an approved apprentice training program in North Dakota. Employers approached the College with a request to develop a site-based apprenticeship training program which has face-to-face and hands-on components for existing and future sheet metal apprentices.

State and National Trends (extracted December 2, 2013)
http://www.careerinfonet.org/occ_rep.asp?optstatus=011000000&soccode=472211&id=1&nodeid=2&stfips=30&search=Go#SectionOp3

United States	Employment		Percent Change	Job Openings [1]
	2010	2020		
Sheet Metal Workers	136,100	160,000	+18%	4,700
Montana	**Employment**		**Percent Change**	**Job Openings [1]**
	2010	2020		
Sheet Metal Workers	710	840	+19%	30

[1] Job Openings refers to the average annual job openings due to growth and net replacement.

Using Montana Workforce Information Occupation Employment Projections, Montana projects strong employment growth between 2010 and 2020, growing from 731 to 890 jobs. Annual statewide job growth for sheet metal workers is estimated to be 33.

National and Montana State Wages reported for this occupation (Extracted December 2, 2013)
http://www.careerinfonet.org/occ_rep.asp?optstatus=011000000&soccode=472211&id=1&nodeid=2&stfips=30&search=Go

Location	Pay Period	2012				
		10%	25%	Median	75%	90%
United States	Hourly	$12.17	$15.56	$20.81	$27.87	$35.93
	Yearly	$25,300	$32,400	$43,300	$58,000	$74,700
Montana	Hourly	$12.95	$15.93	$20.23	$24.88	$27.95
	Yearly	$26,900	$33,100	$42,100	$51,800	$58,100

4. Institutional and System Fit

A. What is the connection between the proposed program and existing programs at the institution?

Helena College has a longstanding and robust history of developing trades and technology programs to meet local, regional and state employer needs for a skilled workforce. This program would become the first Montana registered apprenticeship program at Helena College, but joins existing programs in Welding, Metals Technology, Computer Aided Manufacturing, Construction Technology, Aviation Maintenance Technology, Diesel Technology and Automotive Technology.

The proposed apprenticeship agreement with the Montana Department of Labor Apprenticeship and Training fits well with existing 2-year degree programs. This training program offers students an opportunity to enter the apprenticeship program after obtaining employment with a contractor and earn a certificate of completion after successfully completing 29 course credits.

B. Will approval of the proposed program require changes to any existing programs at the institution? If so, please describe.

The approval of this program of study will not require changes to existing programs at Helena College. In fact, existing courses will be utilized as part of the apprenticeship program and existing equipment purchased for hands-on learning within existing programs will be used in the proposed program.

C. Describe what differentiates this program from other, closely related programs at the institution (if appropriate).

This program will offer in-depth study and hands-on learning in a specialized area of residential and commercial construction. Students entering the program are employed by local contractors and businesses as apprentices. In partnership with the Montana Department of Labor and Industry Apprentice and Training, Helena College is developing an apprenticeship and training program for sheet metal workers.

D. How does the proposed program serve to advance the strategic goals of the institution?

Development and implementation of this program offering meets Helena College University of Montana vision, mission, core themes and strategic goals. After reading the College mission, vision, core themes, and strategic goals, the catalyst for developing this program is to provide lifelong educational opportunities, to be a responsive regional provider of educational opportunities, and to meet the regional workforce needs.

Mission Statement: Helena College University of Montana, a comprehensive two-year college, provides access to and support of lifelong educational opportunities to our diverse community.
Vision Statement: Helena College will be recognized as a responsive regional provider of comprehensive educational opportunities, as a partner in economic and community development, and as a diverse and accessible community of learners. Helena College will promote excellence in education, maintain fiscal and operational integrity; and cultivate an environment of fellowship, inclusiveness, and respect.

Core Themes

- Provide access and support; high quality educational activities and programs important to achieving student success.
- Demonstrate academic excellence; a high degree of integrity, quality and reliability in all academic and non-academic programming.
- Strengthen the community; meeting regional workforce needs, strengthening employee knowledge and skills, providing a bridge to additional educational attainment through advanced degrees, and serving as a facilitator for cultural enrichment.

Strategic Goals:

1 Partner for student success
2 Integrate planning and assessment
3 Attain excellence
4 Support the community
5 Advance the institution
6 Develop resources

E. Describe the relationship between the proposed program and any similar programs within the Montana University System. In cases of substantial duplication, explain the need for the proposed program at an additional institution. Describe any efforts that were made to collaborate with these similar programs; and if no efforts were made, explain why. If articulation or transfer agreements have been developed for the substantially duplicated programs, please include the agreement(s) as part of the documentation.

After a discussing this proposal with the State Director of Apprentice and Training, Darrell Holzer, confirmation was received there are no Montana University System Colleges or Universities offering a sheet metal apprenticeship training program.

MSU-Northern has recognized agreements with Montana Department of Labor and Industry Apprenticeship Training in HVAC, Electrical and Plumbing

Flathead Valley Community College has recognized agreements with Montana Department of Labor and Industry Apprenticeship Training in Electrical.

5. Program Details

A. Provide a detailed description of the proposed curriculum. Where possible, present the information in the form intended to appear in the catalog or other publications. NOTE: In the case of two-year degree programs and certificates of applied science, the curriculum should include enough detail to determine if the characteristics set out in Regents' Policy 301.12 have been met.

See attachment.

B. Describe the planned implementation of the proposed program, including estimates of numbers of students at each stage.

Year one	20 new students per year
Year two	15 students year one students(accounting for attrition) 20 new students
Year three	15 year two students 20 new students
Year four	15 year three students 20 new students
Total students in the program at year four	20+15+15+15 = 65 students

6. Resources

A. Will additional faculty resources be required to implement this program? If yes, please describe the need and indicate the plan for meeting this need.

Additional faculty resources are required to fully implement the apprenticeship training agreement between Helena College University of Montana and Montana Department of Labor and Industry Apprenticeship and Training. Because the core instruction will occur during evening and weekend hours each month, the College will contract with a qualified adjunct instructor for the first two semesters of the training program.

Resources to cover program and personnel costs will be allocated from existing current fund monies in programs currently in moratorium due to very low enrollments. Reallocation of existing resources will occur during the 2014-15 Helena College budget development process finalized in April 2014.

B. Are other, additional resources required to ensure the success of the proposed program? If yes, please describe the need and indicate the plan for meeting this need.

The College intends to utilize existing equipment, systems and processes to offer this training program.

A budget for equipment and program supplies has been developed and is part of the Helena College 2013-14 budget development process. This request is not a request for enhancement and funds will be reallocated within the existing College budget in support of this program.

In addition, contractors and future employers have pledged support in the form of equipment for student learning.

7. Assessment

How will the success of the program be measured?

The best, most accurate measure of student success is performance on the job. The College faculty and contractors will maintain close contact in order to assess student success, and validate the related classroom instruction against industry-recognized standards.

8. Process Leading to Submission

Describe the process of developing and approving the proposed program. Indicate, where appropriate, involvement by faculty, students, community members, potential employers, accrediting agencies, etc.

This proposal was developed by the College after we received numerous requests from contractors. The College Dean, the Associate Dean for Academics, the Division Chair for Trades Technology, and the Chair of the Curriculum Committee all played a role in outlining the program. The program outline was developed in concert with seasoned sheet metal workers, construction supervisors and contractors. In addition, the Montana Department of Labor and Industry Apprenticeship and Training Program Director, Darrel Holzer, served as the liaison and provided input, expertise and resources to ensure approval of the Memo of Understanding with his agency.

The internal process for program proposal approval is submission to Helena College University of Montana Academic Standards and Curriculum Review Committee, Helena College Leadership Council, and finally to the President of the University of Montana. After the proposal is edited after passing through these stages, it is submitted to the Montana Board of Regents for review and consideration.

HELENA COLLEGE
SHEET METAL
APPRENTICESHIP
PROGRAM 2014-2018

Year 1	**OJT HOURS**					
Intro to Sheet Metal - Unit 1		Hours	Lecture	Lab	Shop	Credits
Safety and Health (Online)/SHML 100		45	3			3
Rigging /CSTN200		75	1	2		3
Sheet Metal Orientation/ SHML 110		75	1	2		3
Materials, Hand Tools, and Fasteners / SHML 120		75	1	2		3
Coop		105	1		2	3
Total Hours	**2000**	**375**				**15**
Year 2						
Sheet Metal Basics - Unit 2						
Practical Math/M111T (Online)		45	3			3
Metallurgy/MCH 240		15	1			1
Basic Ductwork Installation		75	1	2		3
Tech Writing		45	3			3
Drafting & Layout Tools		45	1	3		3
Coop		105	1		2	3
Total Hours	**2000**	**330**				**16**
Year 3						
Basic Sheet Metal Layout and Fabrication - Unit 3						
Blueprint reading and uniform building codes		45	3			3
Soldering and Resistance Welding /WLDG 133		105	1	3		4
Intro to Layout and Pattern Making/WLDG 131		60	2	1		3
Duct Liners and Insulation		75	1	2		3
HR 110T/ or Related instruction human relations		45	3			3
Coop		105	1		2	3
Total Hours	**2000**	**435**				**19**
Year 4						
Sheet Metal Application - Unit 4						
Sheet Metal Shop Practices		75	1	2		3
Advanced Layout & Fabrication/Plasma Cutting		75	1	2		3
Psychrometrics and Duct Sizing		45	3			3
Stainless Steel Orientation		75	1	2		3
Architectural Sheet Metal		75	1	2		3
Coop		105	1		2	3
Total Hours	**2000**	**450**				**18**
	Total Academic Credits					**68**

OJT Field Requirements

Year 1

1. Demonstrate proper knowledge of how to use items in a first aid kit.
2. Demonstrate proper use of equipment including harnesses, eye protection, hard hats, respirators, tie off ropes, fall barriers, scaffolding, and ladders.
3. Identify the proper fire extinguisher for the type of fire.
4. Demonstrate how to properly use a fire extinguisher.
5. Perform basic inspection techniques, knots, and load handling.
6. Operate a skid steer, three forklifts each with different capacities, a rough terrain forklift, and scissor lifts.
7. Identify types of metal from a collection of materials to instructor standards.
8. Identify common sheet metal fittings.
9. Use a standard sheet metal gauge to measure various metal thicknesses to given standards.
10. Identify a given hand tool, state its application, and describe its safe use and maintenance.
11. Demonstrate the use of a given hand tool, according to standards as given by the instructor.
12. Identify a given power tool, state its application, and describe its safe use and maintenance.
13. Demonstrate the use of a power tool, according to standards as given by the instructor.
14. Identify a given shop machine, state its application, and describe its safe use and maintenance.
15. Demonstrate the use of a shop machine, according to standards as given by the instructor.
16. Select the most suitable tool or machine for a given application.
17. Demonstrate the use of the selected tool, according to standards as given by the instructor.
18. Transfer a sheet metal pattern to a piece of sheet metal to given standards.
19. Use hand snips to make the following cuts to given standards on 24-gauge or lighter sheet metal: straight cuts, outside curved cuts, and internal cuts.
20. Perform a double cut on light pipe to given standards.
21. Use shears to square a piece of light-gauge sheet metal for ductwork to within 1/16 inch.
22. Use stakes to form a cone for a weather cap to given standards.
23. Use stakes to form a 90-degree bend to given standards.
24. Use a slip-roll forming machine to make two sections of round pipe with grooved seams to given standards.
25. Use a box and pan brake to make right-angle bends to given standards on light-gauge stock.
26. Use a bar folder to make a hem bend to given standards.
27. Use a hand brake to make a Pittsburgh seam to given standards.
28. Make a crimped edge on round pipe to given standards.
29. Join two sections of round pipe by crimping and beading to given standards.
30. Solve problems in relationship to scale ratios found on an architect's scale.
31. Determine the square footage of a flat surface that is rectangular or square.
32. Determine the circumference of a circle when the diameter is known.
33. Determine the area of a circle.
34. Read the architect's scale at various ratios.
35. Use the OWL Method to calculate a specified offset.

YEAR 2

1. Identify different types of ferrous and nonferrous metals.
2. Demonstrate proper uses of different metals.
3. Use metal numbering systems.
4. Use different types of heat-treating on various metals.
5. Identify a variety of fasteners and demonstrate proper application of the fastener.
6. Determine the various specifications of given fasteners.
7. Classify hangers by types and applications.
8. Demonstrate the proper method of installing selected duct hangers, supports, and reinforcements.
9. Connect and seal rectangular and round duct.
10. Properly install an exterior louver.
11. Properly install an opposed-blade damper.
12. Properly install an access door.
13. Demonstrate the ability to use fractions and decimals in field calculations.
14. Demonstrate proper pattern development and layout.
15. Use proper Identify layout tools.
16. Identify different views used when sketching and describe their applications including elevation, plan, section, and auxiliary.
17. Demonstrate layout of the following: simple/straight line, parallel line, radial line, and triangulation.
18. Transfer a sheet metal pattern to a piece of sheet metal to given standards.
19. Use hand snips to make the following cuts to given standards on 24-gauge or lighter sheet metal: straight cuts, outside curved cuts, and internal cuts.
20. Perform a double cut on light pipe to given standards.
21. Use shears to square a piece of light-gauge sheet metal for ductwork to within 1/16 inch.
22. Use stakes to form a cone for a weather cap to given standards.
23. Use stakes to form a 90-degree bend to given standards.
24. Use a slip-roll forming machine to make two sections of round pipe with grooved seams to given standards.
25. Use a box and pan brake to make right-angle bends to given standards on light-gauge stock.
26. Use a bar folder to make a hem bend to given standards.
27. Use a hand brake to make a Pittsburgh seam to given standards.
28. Make a crimped edge on round pipe to given standards.
29. Join two sections of round pipe by crimping and beading to given standards.

YEAR 3

1. Demonstrate the use of linear measure in the field.
2. Measure perimeter, area, and volume in relation to field problems.
3. Demonstrate use of geometry and trigonometry in the field.
4. Determine allowances and stretchouts when necessary in field measuring.
5. Use and recognize basic sheet metal symbols in a blueprint.
6. Demonstrate a working knowledge of sheet metal abbreviations.
7. Construct a working drawing.
8. Prepare a ductwork materials list from a working drawing.
9. Clean and forge a soldering iron.
10. Tin a soldering iron.
11. Tack solder to hold two pieces in the horizontal position.
12. Produce a stable and waterproof seam in galvanized sheet metal with raw acid and solder.
13. Solder a vertical seam to produce a stable and waterproof application.
14. Conduct visual and mechanical tests to determine proper spot welder adjustments.
15. Properly use an oxyacetylene welding torch in adherence with safety standards.
16. Braze together two pieces of metal to form a stable waterproof seam.
17. Fusion weld two pieces of metal to form a stable waterproof seam.
18. Use an oxyacetylene cutting torch to cut a piece of metal leaving no bottom slag or ragged edges.
19. Arc weld two metals together with a stable and waterproof seam.
20. Grind a welded seam to produce a smooth finish free of imperfections.
21. Grind and polish a stainless steel seam to a high-luster finish.
22. Install liner in a rectangular duct.
23. Install liner in different fittings.
24. Insulate straight duct and fittings.
25. Decipher between different types of insulation and determine proper use in the field.
26. Identify and demonstrate use of insulation tools.

YEAR 4

1. Learn proper usage of sheet metal tools and machinery.
2. Demonstrate safety in the sheet metal shop.
3. Use sheet metal fasteners specific to the sheet metal shop.
4. Use patterns to cut metals in the sheet metal shop.
5. Use punches and drills for riveting.
6. Demonstrate the ability to fold edges and make seams.
7. Use techniques in the sheet metal shop including beading forming, crimping, and grooving.
8. Lay out 7 of the 12 following fittings:
    - Rectangular weather cap
    - Symmetrical tapered duct
    - Roof pitch stack flange
    - Cone-shaped exhaust weather cap
    - Roof peak gravity ventilator
    - Round duct intersecting a tape
    - Tapered offset duct
    - Two-way Y-branch
    - Off-center tapered duct
    - Square-to-square tapered duct
    - Shoe tee intersecting a taper on center
    - Tapered elbows 90 degrees
9. Lay out and fabricate seven fittings from among the following:
    - Grooved lock seam
    - Flexible connection
    - Pittsburgh seam
    - Mitered fitting
    - Square elbow
    - 90-degree elbow
    - 90-degree change elbow
    - 45-degree change elbow
    - Rectangular Y-branch
    - 90-degree double Y-branch
    - 90-degree clinch tee
    - Three-piece round offset
    - Transition with three straight sides
    - Transition with two straight sides
    - Double offset
    - Ogee offset
    - Rectangular roof flange
    - Smokestack
    - Gored elbow

- Ogee gutter
- Belt guard
- 90-degree tee
- 45-degree tee
- Type A ventilator

10. Lay out and fabricate seven fittings from among the following:
    - Grooved lock seam
    - Flexible connection
    - Pittsburgh seam
    - Mitered fitting
    - 90-degree elbow
    - 90-degree change elbow
    - 45-degree change elbow
    - Rectangular Y-branch
    - 90-degree double Y-branch
    - 90-degree clinch tee
    - Three-piece round offset
    - Transition with three straight sides
    - Transition with two straight sides
    - Double offset
    - Ogee offset
    - Rectangular roof flange
    - Smokestack
    - Gored elbow
    - Ogee gutter
    - Belt guard
    - 90-degree tee (layout only)
    - 45-degree tee (layout only)
    - Type-A ventilator
11. Cut a given size opening using a portable plasma cutter.
12. Use a computerized program to burn out rectangular duct fittings, square to round patterns, roof jacks, storm collars, etc.
13. Use a flow hood to measure air volume out of a grille or diffuser.
14. Solve field problems using the friction loss per 100 feet chart.
15. Solve field problems using the friction chart.
16. Use a sling psychrometer to calculate relative humidity.
17. Determine the cubic feet per minute (CFM) being delivered by a given forced air system.
18. Lay out and fabricate a stainless steel project to correct specifications.
19. Grind and polish a stainless steel seam to a high-luster finish.
20. Lay out, fabricate, and install four of the following:
    - Stationary, adjustable, triangular, or round louver

- Scupper
- Gutter
- Flashing and counterflashing
- Decking
- Cap flashing
- Fascia

21. Install a roof slope stack flange (roof tall cone), storm collar, and weather cap.

DEPARTMENT OF LABOR AND INDUSTRY
WORKFORCE SERVICES DIVISION
APPRENTICESHIP & TRAINING PROGRAM

REGISTERED APPRENTICESHIP & TRAINING PROGRAM
MONTANA DEPARTMENT OF LABOR & INDUSTRY

GOVERNOR STEVE BULLOCK

PO BOX 1728

STATE OF MONTANA

(406) 444-3998

HELENA, MONTANA 59624-1728

January 14, 2014

Tammy Burke, M.S.
Helena College, U of M
1115 N. Roberts
Helena, MT 59601

Dear Ms. Burke:

The Apprenticeship and Training Program is pleased to learn that if all goes well, Helena College will soon have the related instruction component for the Sheet Metal apprenticeship training program operational. I'm also pleased that you have obviously received enough employer interest in the program to make it a viable investment for Helena College.

Personally, I wish all of our apprentices could have the option of having classroom instruction for their related training. And while some seem to do just fine with the correspondence coursework, many struggle to complete that requirement on schedule in tandem with their on-the-job training hour requirements...

I wish you the best on your presentation to the Board of Regents and we look forward to building on our relationship with Helena College, as we together, continue in our efforts to offer excellent career opportunities to our citizens utilizing the registered apprenticeship training model.

Sincerely,

Darrell Holzer, State Director
Apprenticeship & Training Program

OFFICE OF THE GOVERNOR
STATE OF MONTANA

STEVE BULLOCK
GOVERNOR

JOHN WALSH
LT. GOVERNOR

February 3, 2014

Dear Chair McLean and Members of the Board of Regents:

As Governor of the State of Montana, I am truly interested in the preservation and growth of economic and workforce development for all Montanans. It is important that workers be not only skilled, but also educated. I support the growth of industry by promoting the idea of all colleges; in particular two-year technical institutions, participating in collaboration with the State of Montana's Department of Labor and Industry to develop and institute more apprenticeship-style programs geared towards educating and properly training skilled tradesmen and women.

With industry growth continuing in Montana, we must have trained workers to support this growth, and our education system can provide this training. Currently, there are limited apprenticeship-style programs offered by the Montana University System, and this opportunity should be explored. By utilizing in-state programming, this will strengthen the workforce and keep educational dollars in Montana.

I appreciate your valued consideration of this opportunity for educational growth in Montana.

Sincerely,

STEVE BULLOCK
Governor

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