Faculty Senate Minutes
4/23/2021
Virtual Meeting via Zoom

CBB 001: Charie Faught

Zoom: Peter Lucon (Vice-Chair), Atish Mitra (Secretary), Linda Granger, John Ray, Bryce Hill, Tony Patrick, Jackie Timmer, Katherine Zodrow, Mary Maclaughlin, Daniel Autenrieth, Lonnie Horn, Matt Haynes, Miriam Young, Ronald White, Ryan Stapley, Sue Schrader, Raja Nagisetty, Rita Freebourn, Sue Schrader, Tamara Harp, Chris Gammons, Courtney Young, Ulana Holtz

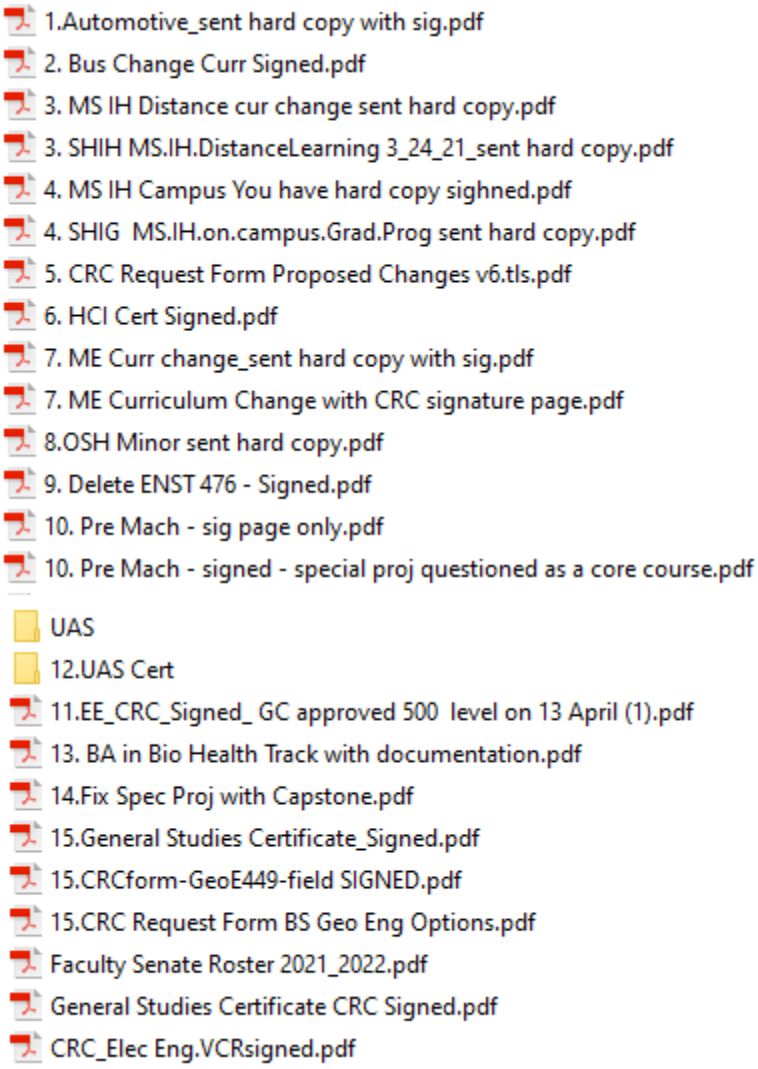
Quorum @ 1:00pm

I. Welcome and Minutes (https://www.mtech.edu/facultystaff/facultysenate/minutes/index.html)

Approvals for April 5, 2021 Meeting Minutes. Motion, and seconded. **PASSED.**

Action Items

II. CRC Items



Motion, and seconded. **PASSED.**

III. Faculty Senate Elections

Chair briefly discussed the duties of senate officers.

Outgoing: Chair - Charie Faugh, Vice-Chair - Peter Lucon, Secretary - Atish Mitra

Secretary - Ulana Holtz nominated (by Chair) and accepted. Motion to accept, and seconded. **PASSED.**

Vicechair – Peter Lucon nominated (by Chair) and accepted. Motion to accept, and seconded. **PASSED.**

Chair – Charie Faugh nominated (by Vice-Chair) and accepted. Motion to accept, and seconded. **PASSED.**

Informational Items

IV. None at this time

Discussion Items

V. Teaching and Learning Center
Chair: Advertisement has been out, and there have been several applicants. Zoom interviews will take place next week for selecting the 3 finalists to invite to campus.

VI. Faculty/Staff Satisfaction Survey
Chair: See emailed announcement from Chancellor about "great places to work" survey. Scheduled to launch on Monday the 26th of April. Will see email from the company about the 15 min anonymous survey. Results will be published.

VII. Activities and priorities for the upcoming year

a. Faculty and Staff Recognition- roundtable
2020-2021 awardees and retiring employees recognized.

b. Strategic Planning
Chair: will have meeting by Chancellor - @Wed 28th April at 11am

c. Fall semester planning
Chair: Fall 2021 is planned to be as close to a normal semester as possible. Mostly face-to-face for traditional classes – potentially enhanced by technology.
In fall 2021, there will be cross pollination between faculty and staff senates. Plan to have a combined meeting between faculty and staff senates once a semester.

d. Review of FS Standards as Compared to MTFA Standards for Instruction, Research and Scholarly Activity, and Service
Chair: A small group will start looking at FS handbook and run through the approval bodies for any suggested changes.

VIII. Other Items
Chair: suggestions for tackling next year? Senator: Senate can be at an oversight role to make sure strategic planning document be actually implemented.
Chair: Suggest meeting every 2 weeks (1 hour each) as in spring 2021.

Motion to adjourn @ 1:49 pm

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Other (for those that are considered in this level but otherwise not listed):

  _____
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

- ☐ Other (for those that are considered in this level but otherwise not listed):

  _____

- ☐ Academic Proposal Request Form

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum or Center/Institute Proposal
  - ☐ Completed Request to Plan, except when eliminating or consolidating
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program
- ☐ Curriculum Proposal
- ☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date February 15, 2021
Dept. Trades and Technical **College:** Highlands College
Program: Automotive Technology **CRC Representative:** Tony Patrick

Description of Request: Remove curriculum, add curriculum, and change credit totals. Also add the word "or" to two listings. This is based on our desire to have the two-year AAS degree the ability to move on to a BAS in business with an automotive emphasis.

Current Course or Program Information: Automotive Technology AAS degree changes

Number (Assigned By CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req.
Delete the following courses:			
AST 102	Introduction to Automotive Service	3	
AST 126	Parts Sourcing	3	
AST 231	Electrical/Electronics Systems II Lab	4	
Add the following courses:			
BGEN 105	Introduction to Business	3	
BGEN 235	Business Law I	3	
ACTG 201	Principles of Financial Accounting	3	
Change the credits in the following courses:			
AST 119	Brake and Chassis Lab	4 to 3 credits	
AST 161	Automotive Engine Repair	4 to 3 credits	
AST 137	Automotive Electrical/Electronics Sys. Lab	4 to 3 credits	
AST 167	Engine Performance & Diag. Lab	4 to 3 credits	
AST 230	Electrical/Electronics Systems Lecture	3 to 4 credits	
AST 265	Applied Lab Experience	4 to 3 credits	
AST 271	Auto. Transmission & Transaxles Lab	4 to 3 credits	
AST 172	Auto. Air Conditioning Lab	4 to 3 credits	
Add "or" to the following:			
M 105 **or** M 121	Contemporary Math **or** College Algebra		
CAPP 131 **or** CAPP 156	Basic MS Office **or** MS Excel		
Change the following to read "Lecture/Lab due to Combined Courses:"			
AST 172	Auto. Air Conditioning Lab to Auto. Air Conditioning **Lecture/Lab**		
AST 230	Electrical/Electronics Systems II Lecture to Electrical/Electronics Systems II **Lecture/Lab**		

List of supporting documentation attached (See Level of Request for Requirements):

Not Applicable.

Assessment Leading to Request

In order to have transferable courses and to allow students to move on to a BAS in business with an automotive emphasis, these changes are required.

Anticipated Impacts to "Other" Programs

None.

Impact on Library: No consultation is required since changes are only in the course number, course name, or course pre-requisites.

Date to take effect: When Approved.

APPROVALS

Department Head Approval Anton Patrut

Date: February 15, 2021

Dean Approval Karen VanDamme

Date 2-11-21

Graduate Council Approval _____

Date _____

CRC Approval _____

Date _____

Faculty Senate Approval _____

Date _____

VCAA Approval (see below) _____

Date _____

Chancellor Approval (see below) _____

Date _____

Old Curriculum Sheet

1st Semester

- AST 118 - Brakes & Chassis *3 credits*
- AST 119 - Brakes & Chassis Lab *4 credits*
- AST 160 - Automotive Engine Repair (Lec) *3 credits*
- AST 161 - Automotive Engine Repair (Lab) *4 credits*
- AST 102 - Introduction To Automotive Service *3 credits*

Total: 17

2nd Semester

- AST 136 - Automotive Electrical/Electronics Systems *3 credits*
- AST 137 - Automotive Electrical/Electronics Systems Lab *4 credits*
- AST 166 - Engine Performance & Diagnostics *2 credits*
- AST 167 - Engine Performance & Diagnostics Lab *4 credits*
- M 111 - Technical Mathematics *3 credits*
- AST 126 - Parts Sourcing *3 credits*

Total: 19

3rd Semester

- COMX 115 - Interpersonal Communication *3 credits*
- DST 260 - Diesel Engine Diagnostic Troubleshooting *3 credits*
- DST 265 - Applied Lab Experience *4 credits*
- AST 270 - Automatic Transmissions and Transaxles *3 credits*
- AST 271 - Automatic Transmissions and Transaxles Lab *4 credits*

Total: 17

4th Semester

- AST 230 - Electrical/Electronics Sys II (Lec) *3 credits*
- AST 231 - Electrical/Electronics Sys II (Lab) *4 credits*
- AST 172 - Automotive Air Conditioning (Lab) *4 credits*
- CAPP 131 - Basic MS Office *3 credits*
- WRIT 100 - Composing Mindfully: Writing Fundamentals *3 credits*

Total: 17

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

NEW CURRICULUM SHEET—First Revision

Automotive Technology AAS
Curriculum Sheet

Course Number	Title	Credits	Semester Completed
	FIRST SEMESTER		
AST 118	Brakes & Chassis	3	
AST 119	Brakes & Chassis Lab	4	
AST 160	Automotive Engine Repair (Lecture)	3	
AST 161	Automotive Engine Repair (Lab)	4	
AST 102	Introduction to Automotive Service	3	
Total Credits		**17**	
	SECOND SEMESTER		
AST 136	Automotive Electrical/Electronics Systems	3	
AST 137	Automotive Electrical/Electronics Systems Lab	4	
AST 166	Engine Performance & Diagnostics	2	
AST 167	Engine Performance & Diagnostics Lab	4	
M 105	Contemporary Math	3	
AST 126	Parts Sourcing	3	
Total Credits		**19**	
	THIRD SEMESTER		
PSYX 100	Introduction to Psychology	3	
DST 260	Diesel Engine Diagnostic Troubleshooting	3	
DST 265	Applied Lab Experience	4	
AST 270	Automatic Transmissions & Transaxles	3	
AST 271	Automatic Transmissions & Transaxles Lab	4	
Total Credits		**17**	
	FOURTH SEMESTER		
AST 230	Electrical/Electronics Systems II (Lecture)	3	
AST 231	Electrical/Electronics Systems II (Lab)	4	
AST 172	Automotive Air Conditioning (Lab)	4	
CAPP 131	Basic MS Office	3	
WRIT 101 or WRIT 121	College Writing **or** Intro. to Technical Writing	3	
Total Credits		**17**	

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Automotive Technology AAS
Curriculum Sheet

Course Number	Title	Credits	Semester Completed
	FIRST SEMESTER		
AST 118	Brakes & Chassis	3	
AST 119	Brakes & Chassis Lab	3	
AST 160	Automotive Engine Repair (Lecture)	3	
AST 161	Automotive Engine Repair (Lab)	3	
M 105 or M121	Contemporary Math or College Algebra	3	
Total Credits		**15**	
	SECOND SEMESTER		
AST 136	Automotive Electrical/Electronics Systems	3	
AST 137	Automotive Electrical/Electronics Systems Lab	3	
AST 166	Engine Performance & Diagnostics	2	
AST 167	Engine Performance & Diagnostics Lab	3	
BGEN 105	Introduction to Business	3	
W 101 or W 121	College Writing I or Intro. to Technical Writing	3	
Total Credits		**17**	
	A STUDENT EXITING THE PROGRAM AFTER THE SECOND SEMESTER WOULD BE AWARDED A CERTIFICATE OF APPLIED SCIENCE IN AUTOMOTIVE TECHNOLOGY		
	THIRD SEMESTER		
BGEN 235	Business Law	3	
DST 260	Diesel Engine Diagnostic Troubleshooting	3	
DST 265	Applied Lab Experience	3	
AST 270	Automatic Transmissions & Transaxles	3	
AST 271	Automatic Transmissions & Transaxles Lab	3	
Total Credits		**15**	
	FOURTH SEMESTER		
AST 230	Electrical/Electronics Systems II Lecture/Lab	4	
ACTG 201	Principles of Financial Accounting	3	
AST 172	Automotive Air Conditioning Lecture/Lab	3	
CAPP 131 or CAPP 156	Basic MS Office or MS Excel	3	
PSYX 100	Introduction to Psychology	3	
Total Credits		**16**	
	TOTAL CREDITS FOR FOUR SEMESTERS	**63**	

Curriculum Change Request Form Dated Jan 24, 2021

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval. **Directions found at the end of the document and can be delated before forwarding to the CRC. Complete sections**
Please indicate the type of request(s) by selecting *all that apply*:

X ***Faculty Approvals*** *(directly to CRC, then Faculty Senate):*
☐ ***Campus Approvals Level I*** *(must be approved by the VCAA prior to CRC submission):*
☐ ***OCHE Approvals Level I*** *(must be approved by the VCAA and Chancellor prior to CRC submission):*
☐ ***OCHE Approvals Level II*** Level II *(must be approved by the VCAA and Chancellor prior to CRC submission):*

1. Date 2/17/2021
2. Department Business
3. College: CLSPS
4. Program: Bachelor of Applied Science (BAS) Business
5. CRC Rep. Tim Kober

6. Description of Request: List options for some General Education requirements

The Department of Business respectively proposes a change in the required business core under its Bachelor of Applied Science Program. Current changes to the Associates of Applied Science degrees at Highlands College have given us an opportunity to add four classes to the Required Business core. It is believed these four classes will improve the quality of the degree.

7. Current Course or Program Information: Bachelor of Applied (BAS) Business

8. Proposed Change As appearing in the catalogue. A new course requires the course outcomes listed in this area.

The proposal would allow us to add the following four courses into the Required Business Core.
BMGT 322 Operations Management
BMGT 453 Business Intel and Big Data
BMIS 311 Management Information Systems
BMIS 320 Business Modeling

These four classes are required for students completing the Bachelor of Science program and it is believed their inclusion in the BAS will better serve these students.

9. Assessment Leading to Request: Transfers/Course subs
The BAS degree allows us to work with students for the two years after the completion of their AAS degree. They are required to complete the general education requirement as well as the business course work within the two years (or 66 credits). As a result, the BAS degree has historically been relatively light on business coursework when compared to the BS degree (40% business coursework for the BAS degree versus 70% business coursework for the BS degree).
The requirements for the AAS were changed this year to include the following courses:
WRIT 101 College Writing or WRIT 121 Intro to Tech Writing
STAT 216 Intro to Statistics
BGEN 235 Business Law
ECNS 201 Principles of Microeconomics or ECNS 203 Principles of Micro and Macroeconomics

Previously, these four courses were included in the post AAS 66 credits that we delivered. Now that they are a part of the AAS, we can replace these four courses with the following four business courses:
BMGT 322 Operations Management
BMGT 453 Business Intel and Big Data
BMIS 311 Management Information Systems
BMIS 320 Business Modeling

The new curriculum under this proposal will increase the business coursework under the BAS to 50 percent of total courses work.

10. List of supporting documentation attached: See *Level of Request* for requirements.

A new curriculum sheet is attached. The changes are presented in red.

11. Impacts:

X No impact to Library or

X Tim Kober consulted with Scott Juskiewicz from the library to ensure needed materials and media are available

X No anticipated impact to other programs or

☐ _____ consulted with _____ from _____ and

Curriculum Change Request Form Dated Jan 24, 2021

APPROVALS	Date and Signature
Department Head	3/16/2021
Dean Approval	3/22/2021
Graduate Council	
CRC	
Faculty Senate	

Campus Approvals Level I *(must be approved by the VCAA prior to CRC submission):*
OCHE Approvals Level I & II *(must be approved by the VCAA and Chancellor prior to CRC submission)*

VCAA Approval	
Chancellor Approval	

Department of Business and Information Technology
Requirements for the Bachelor of Applied Science Degree
Proposed 2021 - 22

			3/16/2021	
Block Transfer (AAS degree): up to 54 Credits*				**Credits:**

General Education: 30 Credits

		Completed	Comments
Communication:	Communication elective*		
	WRIT 322 Adv Business Writing		
Humanities:	BGEN 363 Business Ethics		
	Humanities Elective		
Math (pick 2 of 3):	M 141 Math for Bus and SS I		
	Math elective*		
Physical Science	Physical Science Elective		
	Physical Science Elective with a lab		
Social Sciences:	Social Science Elective*		
	Social Science Elective		

Required Business Core: ~~15 Credits~~ 24 Credits

	Completed	Comments
ACTG 201 Principles of Financial Acct		
ACTG 202 Principles of Managerial Acct		
~~BGEN 235 Business Law I *~~		
BFIN 322 Business Finance		
BMGT 322 Operations Management		
BMIS 311 Management Information Systems		
BMIS 320 Business Modeling		
BMGT 453 Business Intel and Big Data Analytics		
BMGT 426 Strategic Management		

Track Requirements: 21 Credits

	Accounting	Completed	Construction Management	Completed	Management	Completed
Required:	ACTG 301 Intermed Acct I		BMGT 329 Human Res Mgmt or		~~BMIS 311 Mgmt Info Sys~~	
	ACTG 302 Intermed Acct II		BMGT 362 Labor Relations		BMGT 329 Hum Res Mgmt	
	ACTG 321 Acct Info Sys				BMGT 335 Mgmt & Org	
	ACTG 401 Individ Income Tax				BMKT 325 Marketing	
	ACTG 410 Cost/Man Acct					
	ACTG 411 Auditing I					
Electives:	**Pick 1**		**Pick 6**		**Pick 3**	
	ACTG 303 Intermed Acct III		ECIV 208 Const Contracts		ACTG 410 Cost/Man Acct	
	ACTG 402 Adv Income Tax		ECIV 304 Const Means & M		BGEN 236 Business Law II	
	ACTG 412 Auditing II		EGEN 325 Eng Econ Analy		BGEN 360 International Bus	
	ACTG 415 Gov't and Not for P		ECIV 307 Const Est & Bid		~~BMGT 322 Oper Mgmt~~	
	ACTG 436 Advanced Acct		ECIV 391 Temp Structures		BMGT 353 Organiz Behav	
	ACTG 498 Internship		ECIV 405 Cons Proj Plan & S		BMGT 362 Labor Relations	
			~~BMGT 322 Operations Mgmt~~		BMGT 448 Entrepreneurship	
			BMGT 335 Mgmt and Organ		BMKT 337 Cons Behavior	
			BMKT 325 Marketing		BMKT 342 Marketing Research	
			HCI 410 Proj Mgmt and Sys A		HCI 410 Proj Mgmt and Sys A	
			BMGT 498 Internship		~~BMIS 320 Business Modeling~~	
			OSH 224 Safety & Heal Occ		BMIS 415 Mgmt of Info Tech	
			OSH 324 Construct Safety		BMGT 498 Internship	
			~~BMIS 311 Mgmt Info Systems~~		BMIS 416 Enterprise Systems	
			~~BMIS 320 Business Modeling~~			

* The following classes are required as prerequisitives for other business classes and should be included in or in addition to the 54 credit block transfer to complete the degree with 120 credits:
WRIT 101 College Writing or WRIT 121 Intro to Tech Writing (communications elective)
STAT 216 Introduction to Statistics (math elective)
BGEN 235 Business Law
ECNS 201 Principles of Microeconomics or ECNS 203 Principles of Micro and Macro Economics (social science elective)

Department of Business and Information Technology
Requirements for the Bachelor of Applied Science Degree
2019 - 20

			3/16/2021	
Block Transfer (AAS degree): up to 54 Credits				**Credits:**

General Education: 30 Credits

		Completed	Comments
Communication:	WRIT 101 College Writing		
	WRIT 322 Adv Business Writing		
Humanities:	BGEN 363 Business Ethics		
	Humanities Elective		
Math (pick 2 of 3):	M 141 Math for Bus and SS I		
	M 142 Math for Bus and SS II		
	STAT 216 Introduction to Statistics		
Physical Science	Physical Science Elective		
	Physical Science Elective with a lab		
Social Sciences:	ECNS 203 Prin of Micro and Macro		
	Social Science Elective		

Required Business Core: 15 Credits

	Completed	Comments
ACTG 201 Principles of Financial Acct		
ACTG 202 Principles of Managerial Acct		
BGEN 235 Business Law I		
BFIN 322 Business Finance		
BMGT 426 Strategic Management		

Track Requirements: 21 Credits

	Accounting	Completed	Construction Management	Completed	Management	Completed
Required:	ACTG 301 Intermed Acct I		BMGT 329 Human Res Mgmt **or**		BMIS 311 Mgmt Info Sys	
	ACTG 302 Intermed Acct II		BMGT 362 Labor Relations		BMGT 329 Hum Res Mgmt	
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	ACTG 401 Individ Income Tax				BMKT 325 Marketing	
	ACTG 410 Cost/Man Acct					
	ACTG 411 Auditing I					
Electives:	**Pick 1**		**Pick 6**		**Pick 3**	
	ACTG 303 Intermed Acct III		ECIV 208 Const Contracts		ACTG 410 Cost/Man Acct	
	ACTG 402 Adv Income Tax		ECIV 304 Const Means & M		BGEN 236 Business Law II	
	ACTG 412 Auditing II		EGEN 325 Eng Econ Analy		BGEN 360 International Bus	
	ACTG 415 Gov't and Not for P		ECIV 307 Const Est & Bid		BMGT 322 Oper Mgmt	
	ACTG 436 Advanced Acct		ECIV 391 Temp Structures		BMGT 353 Organiz Behav	
	ACTG 498 Internship		ECIV 405 Cons Proj Plan & S		BMGT 362 Labor Relations	
			BMGT 322 Operations Mgmt		BMGT 448 Entrepreneurship	
			BMGT 335 Mgmt and Organ		BMKT 337 Cons Behavior	
			BMKT 325 Marketing		BMKT 342 Marketing Research	
			HCI 410 Proj Mgmt and Sys A		HCI 410 Proj Mgmt and Sys A	
			BMGT 498 Internship		BMIS 320 Business Modeling	
			OSH 224 Safety & Heal Occ		BMIS 415 Mgmt of Info Tech	
			OSH 324 Construct Safety		BMGT 498 Internship	
			BMIS 311 Mgmt Info Systems			
			BMIS 320 Business Modeling			

MS IH Distance Learning/Professional Track

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https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
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   ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
   - ☐ **Documents as listed under establishing a new course (as applicable)**
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   - ☐ New Curriculum Worksheet, with changes highlighted

☐ Other (for those that are considered in this level but otherwise not listed):

_____

Date: 1/10/2021
Dept: SHIH **College:** SME
Program: MS IH Distance Learning/Prof Track **CRC Representative:** Theresa Stack

Description of Request: Revise the course number of the IH 5286 lab component to reflect two separate courses. Currently, IH 5286, Sampling and Evaluation of Health Hazards consists of a spring course that is delivered online (2 credits) as well as a five-day summer lab residency that is delivered face-to-face on campus (1 credit). Requesting a separate course number (IH 5326) and revised name for the 1 credit summer lab component.

Current Course or Program Information: IH 5286 Sampling & Evaluation of Health Hazards

(Distance Learning Students Only)

2 Credits Spring Semester 1 Credit Summer Semester (Hrs: 2 Lec., 1 Lab)

Teaches sampling techniques and procedures as stipulated by occupational safety and health regulatory agencies for evaluating occupational health hazards arising from chemical and physical agents in the workplace. It includes the calibration and use of personal monitoring and direct reading instrumentation for the assessment of an employee's exposure to common industrial hygiene hazards including air contaminants, noise, nonionizing radiation and temperature extremes.
Prerequisite: OSH 421 and 422.

Proposed Change

Course # Name
Credits Pre-req.

IH 5286 Sampling and Evaluation of Health Hazards (Distance Learning Students Only) 2 cr, prerequisite: OSH 421 and 422.
Teaches sampling techniques and procedures as stipulated by occupational safety and health regulatory agencies for evaluating occupational health hazards arising from chemical and physical agents in the workplace.

IH 5326 Sampling and Evaluation of Health Hazards Lab Residency (Distance Learning Students Only) 1 cr. prerequisite: IH 5286

Laboratory residency focusing on industrial hygiene sampling techniques and procedures used for evaluating occupational and public health hazards. Topics include calibration and use of integrated and direct reading techniques for measurement of gas, vapor, and aerosol contaminants, as well as physical hazards including noise, and thermal stress.
Prerequisite: IH 5286

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request Revising the name and course number of the summer lab residency more accurately defines this course in the catalog.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect:. 2021-2022 catalog update which is in effect Summer, 2021.

APPROVALS

Department Head Approval
Date 2-22-21

Dean Approval
Date 3-1-21

Graduate Council Approval
Date 3/26/21

CRC Approval
Date _____

Faculty Senate Approval
Date _____

VCAA Approval (see below)
Date 3/26/21

Chancellor Approval (see below)
Date _____

MONTANA TECHNOLOGICAL UNIVERSITY

IH 5326 Sampling and Evaluation of Health Hazards Lab Residency

Instructor information:
Lorri Birkenbuel, MS, CSP, CIH,CIT; Dan Autenrieth, PhD, CIH, CSP; Julie Hart, PhD, CIH
Email: lbirkenbuel@mtech.edu
Office: Science and Engineering, Rm 320, Phone: 406-496-4290
See Moodle website or LinkedIn for background on the instructor's qualifications.

Course Catalog Description:
Laboratory residency focusing on industrial hygiene sampling techniques and procedures used for evaluating occupational and public health hazards. Topics include calibration and use of integrated and direct reading techniques for measurement of gas, vapor, and aerosol contaminants, as well as physical hazards including noise, and thermal stress.

Pre-requisite:
IH 5286 – Sampling and Evaluation of Health Hazards Lecture

Textbooks:
Recommended: *The Occupational Environment – Its Evaluation, Control and Management* (3rd ed.), Anna, D.H., editor

References:

- American Conference of Governmental Industrial Hygienists – Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. ACGIH 2021.
- National Institute for Occupational Safety and Health Manual of Analytical Methods. Available at: https://www.cdc.gov/niosh/nmam/default.html.
- Occupational Safety and Health Sampling and Analytical Methods. Available at: https://www.osha.gov/dts/sltc/methods/index.html.
- National Ambient Air Quality Standards. Available at: https://www.epa.gov/criteria-air-pollutants.

ANSAC/ABET Program Specific Student Outcomes:
Graduates of the course will have an understanding of:
ANSAC/ABET (c), MT (10) fundamental exposure assessment techniques (both qualitative and quantitative)
ANSAC/ABET (f), MT (13) occupational and environmental standards and regulations

Topics Emphasized:

- Proper calibration techniques for integrated gas/vapor and aerosol sampling.
- Integrated and direct-reading sampling and evaluation techniques for gases and vapors, including the application of low-flow sampling pumps and related media.
- Integrated and direct-reading sampling and evaluation techniques for aerosol size-selective sampling, including the application of high-flow sampling pumps, light scattering instrumentation, and related media.
- Sampling and evaluation techniques for occupational noise, including the application of personal noise dosimeters and sound level meters.
- Sampling and evaluation techniques for thermal stresses, including measurement of wet bulb globe temperature values.

- Surface contamination sampling and evaluation techniques.
- Interpreting sampling data for comparison with applicable occupational and environmental standards and regulations.

Grading Criteria and Scale

Grades will be assigned according to the following: • *A = 92.51% to 100%* • *A- = 89.51% to 92.50%* • *B+ = 86.51% to 89.50%* • *B = 82.51% to 86.50%* • *B- = 79.51% to 82.50%* • *C+ = 76.51% to 79.50%* • *C = 72.51% to 76.50%* • *C- = 69.51% to 72.50%* • *D+ = 66.51% to 69.50%* • *D = 62.51% to 66.50%* • *D- = 59.51% to 62.50%* • *F = 59.50% or less* *90% of course grade: Laboratory Assignments.* Submit lab assignments at the conclusion of each lab section. Review the Assignment Guidance found on Moodle for formatting and required information.
10% of course grade: Comprehensive Lab Review. A comprehensive lab review will be conducted on Friday of the lab residency.
If you are submitting handwritten math solutions, please **write legibly** and be sure the logic can be followed. **Mark the final answer in some way (highlight, circle, etc)**. Lab notes do not need to be typed but must be legible.

Administrative Matters:

Academic honesty: The instructor will begin the course assuming all students are honest about their academic work. The assumption will be weakened if a student engages in an act that appears to be academic dishonesty. Students are expected to know the Montana Tech policy on student academic dishonesty. The policy applies to this course, and a link to the text of the policy is provided on the course website. Upon discovering an act of academic dishonesty, the instructor will assign a zero grade for the assignment, exam, or lab, and report the act to the Department Head and Dean. Additionally, the instructor may, at his discretion, assign an "F" grade for the course to a student who violates the campus academic dishonesty policy.

Emergency response: In the event of an emergency notification, students evacuate the S&E Building and assemble **on the sidewalk on the south side of Park Street near Leonard field by the handrail**. Once there, sign one of the rosters.

Disabilities: Students with disabilities who believe they may need accommodations in this class are encouraged to contact a Montana Tech Disability Services Coordinator (DSC) at either 496-4429 (North Campus) or 496-3730 (South Campus). Please obtain from them a letter from a Montana Tech Disability Coordinator authorizing your accommodations is needed.

Classroom behavior policy: During class periods and labs, students are expected to be focus on the class topic and avoid any behavior that may disrupt the learning experiences of other students. Comments during discussions must avoid offending any other students regarding race, ethnicity, religious beliefs, sexual preference, and political opinions.

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*

   X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
   - ☐ Course Number
   - ☐ Course Outcomes
   - ☐ Course Description
   - ☐ Syllabus
   - ☐ Pre-requisites or co-requisites
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

   ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
   - ☐ **Documents as listed under establishing a new course (as applicable)**
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

☐ Other (for those that are considered in this level but otherwise not listed):

_____

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date: 1/21/21
Dept: SHIH **College:** SME
Program: MS IH Distance Learning/Prof Track **CRC Representative:** Theresa Stack

Description of Request: Include IH 5086, Aerosol Science, as an elective course in the MS IH Distance Learning/Professional Track Program

Current Course or Program Information: The course has been taught previously as a special topic class.

Proposed Change

Course # Name
Credits **Pre-req: Graduate standing or consent of instructor**
IH 5086, Aerosol Science, 3 credit elective
This course covers the properties that influence aerosol sampling such as the physics of air, Brownian motion and diffusion, and aerodynamic properties. In addition, occupational and environmental sources of aerosols along with relevant occupational and environmental exposure limits and assessment strategies are discussed.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request This course has been taught on three occasions as a special topic elective. This request is to transition this course from a special topic to an elective course in the MS IH Distance Learning/Professional Track Program.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect:. 2021-2022 catalog update which is in effect Summer, 2021.

APPROVALS

Department Head Approval _____
Date 2-22-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date 3/26/21

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date 3/26/21

Chancellor Approval (see below) _____
Date _____

MONTANA
TECHNOLOGICAL UNIVERSITY

IH 5086 Aerosol Science

Instructor information:
Julie Hart, PhD, CIH
Email: jhart@mtech.edu
Office: Science and Engineering, Rm 327, Phone: 406-496-4792
See Moodle website or LinkedIn for background on the instructor's qualifications.

Course Catalog Description:
This course is designed to provide students with an advanced understanding of aerosol exposure assessment. Topics such as air and particle properties that influence aerosol dispersion, aerosol deposition, aerosol dose, size selection criteria for aerosol sampling, relevant occupational and ambient exposure limits, and aerosol exposure assessments for contaminants from engineered nanoparticles to bioaerosols are covered.

Pre-requisite:
Graduate standing or consent of instructor.

Textbook:

Aerosol Technology, Properties, Behavior, and Measurement of Airborne Particles, William C. Hinds Vincent, 2nd Ed., 1999. ISBN-13: 978-0471194101 ISBN-10: 0471194107.

References:

- Aerosols Handbook: Measurement, Dosimetry, and Health Effects, Second Edition 2nd Edition. 2019 CRC Press. ISBN-13: 978-0367866112 ISBN-10: 0367866110
- American Conference of Governmental Industrial Hygienists – Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. ACGIH 2021.
- National Institute for Occupational Safety and Health Manual of Analytical Methods. Available at: https://www.cdc.gov/niosh/nmam/default.html.
- Occupational Safety and Health Sampling and Analytical Methods. Available at: https://www.osha.gov/dts/sltc/methods/index.html.
- National Ambient Air Quality Standards. Available at: https://www.epa.gov/criteria-air-pollutants.

Course Objectives:
After successfully completing this course, the student will be able to:

- Describe the fundamental factors that influence aerosol movement in air including Stoke's law, terminal settling velocity, and aerodynamic diameter.
- Describe the primary and secondary deposition mechanisms of aerosols and inhaled dose.
- Understand aerosol dispersion properties.
- Interpret and apply occupational and ambient aerosol size selection sampling criteria, sampling media and exposure limits.
- Understand primary mechanisms for particle filter deposit analyses.
- Interpret and describe aerosol assessment case studies for contaminants, e.g., crystalline silica, asbestos, bio-aerosols (spores, pathogens), naturally occurring and engineered ultrafine (nano) particles.

Grading Criteria and Scale

Grading: Three Exams..... 40%
Module Assignments.....40%
Group case study project.....20%

All grades will be determined as follows:
A 93-100
A- 89.51 —92.99
B+ 87—89.50
B 83—86.99
B- 79.51 —82.99
C+ 77—79.50
C 73—76.99
C- 69.51—72.99
D+ 67—69.50
D 63—66.99
D- 59.51—62.99
F ≤ 59.50

Administrative Matter

Missed exams and labs: Students must notify instructor of excuse prior to the missed exam. Instructor will attempt to schedule these activities so as to avoid conflicts with the away-game travel of student athletes. The instructor will consider excuses on a case-by-case basis, and work with individual students to facilitate making up the activity. Making up required activities is a privilege, not a right. Quizzes are a component of class participation and will not be made up.

Academic honesty: The instructor will begin the course assuming all students are honest about their academic work. The assumption will be weakened if a student engages in an act that appears to be academic dishonesty. Students are expected to know the Montana Tech policy on student academic dishonesty. The policy applies to this course, and a link to the text of the policy is provided on the course website. Upon discovering an act of academic dishonesty, the instructor will assign a zero grade for the assignment, exam, or lab, and report the act to the Department Head and Dean. Additionally, the instructor may, at his discretion, assign an "F" grade for the course to a student who violates the campus academic dishonesty policy.

Disabilities: Students with disabilities who believe they may need accommodations in this class are encouraged to contact a Montana Tech Disability Services Coordinator (DSC) at either 496-4429 (North Campus) or 496-3730 (South Campus). Please obtain from them a letter from a Montana Tech Disability Coordinator authorizing your accommodations is needed.

Prepared by: Julie Hart **Date**: February 12, 2021

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*

   X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:

   - ☐ Course Number
   - ☐ Course Outcomes
   - ☐ Course Description
   - ☐ Syllabus
   - ☐ Pre-requisites or co-requisites
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

   ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:

   - ☐ **Documents as listed under establishing a new course (as applicable)**
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

☐ Other (for those that are considered in this level but otherwise not listed):

_____

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date: 1/21/21
Dept: SHIH **College:** SME
Program: MS IH Distance Learning/Prof Track **CRC Representative:** Theresa Stack

Description of Request: Revise the credits associated with IH 5986, Comprehensive Written and Oral Exam, from three to two credits and revise the catalog description.

Current Course or Program Information: IH 5986- Comprehensive Written & Oral Exam 3 credits

Prerequisites: Prior to Registering for IH 5986, Comprehensive Written and Oral Examination, all deficiency credits must be completed. In addition, all MS IH coursework must be completed, or be completed concurrently with IH 5986 during the final semester of study.

Proposed Change

Course # Name
Credits Pre-req.
IH 5986- Comprehensive Written & Oral Exam, 2 credits
This is the capstone course for the M.S. Distance Learning/Professional Track Industrial Hygiene Program. Students complete both a written and oral examination which focus on the nine core courses in the curriculum as a condition of graduation. Credit is awarded upon satisfactory completion of the written and oral exam.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request A continuous improvement assessment, as a component of our Applied Natural Science Accreditation Commission of ABET (ANSAC/ABET) accreditation process, revealed that two credits more accurately reflect the level of effort associated with this capstone exam.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect:. 2021-2022 catalog update which is in effect Summer, 2021.

APPROVALS

Department Head Approval _____
Date 2-22-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date 3/26/21

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date 3/26/21

Chancellor Approval (see below) _____
Date _____

IH 5986 –Comprehensive Written & Oral Exam

1. Fall Semester 2021
   CRN: 75207 IH 5986 –Comprehensive Written and Oral Exam

2. Industrial Hygiene Core Course – 2 credits

3. Instructor information:

   Dr. Julie Hart. Office in S&E 327. Phone: 406-496-4792. Email: jhart@mtech.edu.
   See Moodle website for background on instructor's qualifications.

4. Textbook:
   No specific textbook required for this course. However, all textbooks cited in the Industrial Hygiene core courses are reference textbooks.

5. Course Catalog Description:

This is the capstone course for the M.S. Distance Learning/Professional Track Industrial Hygiene Program. Students complete both a written and oral examination which focus on the nine core courses in the curriculum as a condition of graduation. Credit is awarded upon satisfactory completion of the written and oral exam.

Prerequisite: Graduate standing or consent of instructor. Prior to registering for the course, all deficiency credits must be completed. In addition, all MS IH coursework must be completed, or be completed concurrently with IH 5986 during the final semester of study.

6.Student Outcomes:

ABET Student Outcome	MT Tech Performance Indicator	MT Tech Performance Indicator Description
4	4.b	Effective oral communication (oral exam component)

7. Topics Covered:

Students will demonstrate their knowledge of the following subject matter areas. These topics are based on core courses within the MS Industrial Hygiene/Distance Learning Professional Track Program.

Industrial Hygiene – Chemical & Biological Stressors
Industrial Hygiene – Physical Stressors
Sampling and Evaluation of Health Hazards
Industrial Toxicology
Industrial Hygiene Management
Ergonomics
Epidemiology
Statistics
Industrial Safety

Course Grade Determination:
Grading for the Comprehensive Written and Oral Exam is a pass/fail approach. The written exam is provided near week 7 (summer) or 8 (fall and spring) in the semester. Upon successful completion of the written exam (≥70%) students may schedule the oral exam. If a student does not successfully pass the written exam, he/she must reschedule this following semester. The student will not be allowed to complete the oral portion without first passing the written component. The oral exam is conducted via zoom. At least three MS IH faculty members will be present for the oral exam. A passing score on the oral exam considered when 2/3 of the exam committee (or more) rate the overall responses as adequate or above. If a student does not successfully pass the oral exam, he/she must retake the class in a future semester.

Contribution of Course to Meeting the Professional Component:
Industrial Hygiene – 2 credits

Prepared by: Julie F. Hart **Date**: December 20, 2020

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*

   X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
   - ☐ Course Number
   - ☐ Course Outcomes
   - ☐ Course Description
   - ☐ Syllabus
   - ☐ Pre-requisites or co-requisites
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

   ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
   - ☐ **Documents as listed under establishing a new course (as applicable)**
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

☐ Other (for those that are considered in this level but otherwise not listed):

_____

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date: 1/26/2021
Dept: SHIH **College:** SME
Program: MS IH Distance Learning/Prof Track **CRC Representative:** Theresa Stack

Description of Request: Revise the course title of IH 5156 – Noise (3 credits) to IH 5156 - Occupational and Community Noise (3 credits). In addition, revise description to clarify what is being taught in the course. Finally, revise the prerequisite to "Graduate standing or consent of instructor" to match other course prerequisites in the program. This course is an elective in the IH program.

Current Course or Program Information: IH 5156 Noise

3 Credits Fall Semester (Hrs: 3 Lec.)

Designed to familiarize students with the evaluation and control of noise. Emphasizes the selection of appropriate evaluation techniques, instruments, analysis of data, and design of adequate and cost-effective controls.
Prerequisite: PHSX 123 and Graduate Standing or Consent of Instructor. Course generally offered 1st semester.

Proposed Change

Course # Name
Credits Pre-req.
IH 5156 Occupational and Community Noise 3 cr, prerequisite: Graduate standing or consent of instructor.
This course is designed to familiarize students with the evaluation and control of occupational and environmental noise. The physics of sound, mechanisms of hearing loss, selection of appropriate noise evaluation techniques, instruments, analysis of data, and design and selection of noise controls are emphasized.

List of supporting documentation attached (See Level of Request for Requirements):

- Revised Syllabus
- Revised Curriculum Worksheet, with highlighted changes

Assessment Leading to Request The course title and description are being changed to more accurately reflect what is being taught in the course. The prerequisite change is being changed to align better with prerequisites of other courses in the IH program.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: No consultation is required

Date to take effect:. 2021-2022 catalog update which is in effect Summer, 2021.

APPROVALS

Department Head Approval
Date 2-22-21

Dean Approval
Date 3-1-21

Graduate Council Approval
Date 3/16/21

CRC Approval
Date _____

Faculty Senate Approval
Date _____

VCAA Approval (see below)
Date 3/26/21

Chancellor Approval (see below)
Date _____

IH 5156 – OCCUPATIONAL AND COMMUNITY NOISE (3 Credits)

Instructor

Dan Autenrieth, PhD, CIH, CSP
Contact Information: dautenrieth@mtech.edu ; (406) 496-4339 ; S&E Building Room 326

Introduction

This course is designed to familiarize students with the evaluation and control of occupational and environmental noise. The physics of sound, mechanisms of hearing loss, selection of appropriate noise evaluation techniques, instruments, analysis of data, and design and selection of noise controls are emphasized.

Course Objectives

After successfully completing this course, the student will be able to:

- Identify and describe the structures and function of the human ear
- Describe the impact that hazardous noise can have on hearing
- Describe the physical nature of noise, manipulate the relationships between power, intensity, and pressure and relate them to damage risk potential (hearing loss or other risk) for exposure to noise in the occupational environment
- Anticipate, recognize, evaluate, and control occupational and community noise
- Interpret noise monitoring results as they relate to relevant standards
- Describe and apply the principles of noise reduction at sources, receivers, and in the path between sources and receivers in a variety of exposure scenarios

Grading

This course is graded on a points-earned basis with the following weight given to each grading category:

- Examinations: 4 totaling 40% of your final grade
- Homework assignments: 10 totaling 60% of your final grade (2 lowest are dropped)

Grades will be assigned according to the following:

- A = 92.51% to 100%
- A- = 89.51% to 92.50%
- B+ = 86.51% to 89.50%
- B = 82.51% to 86.50%
- B- = 79.51% to 82.50%
- C+ = 76.51% to 79.50%
- C = 72.51% to 76.50%
- C- = 69.51% to 72.50%
- D+ = 66.51% to 69.50%
- D = 62.51% to 66.50%
- D- = 59.51% to 62.50%
- F = 59.50% or less

In addition, the following requirements shall be strictly adhered to:

- Percentages will be computed to two decimal places and rounded to the nearest whole number (X.50 will be rounded down to X; X.51 will be rounded up).
- Assignment due-date times are at 11:59 PM on the scheduled due date (see pages 5 and 6 for assignment due dates).
- Late assignments will be penalized by a 10 percent grade reduction per day except for prior arrangements or in the case of extraordinary circumstances beyond the control of the student.

Textbook

- Brazile, B., Autenrieth, D.: Occupational and Community Noise: A Guide for Environmental Health and Safety Students. Kendall Hunt Publishing Company, Dubuque, IA (2017).

https://he.kendallhunt.com/product/occupational-community-noise-guide-environmental-health-safety-students

Examinations

There will be four examinations administered in this course, each worth 10 percent of your final grade (40% total).

Homework Assignments

There will be 10 total homework assignments. The highest eight will count toward your grade at 7.5% each (60% total), and the lowest two will be dropped. Homework assignments consist mainly of individual noise-related practice problems.

Academic Honesty and Dishonesty

Academic honesty is expected of all our students at all times. For more information on our policies related to academic honesty and dishonesty, please see the Montana Tech catalog at: https://catalog.mtech.edu/

ADA Statement

The Americans with Disabilities Act requires that reasonable accommodations be made for students with disabilities. If you need such assistance, please contact your instructor as soon as possible. Additional assistance can be found at: https://www.mtech.edu/disability/index.html

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*

   X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:

   - ☐ Course Number
   - ☐ Course Outcomes
   - ☐ Course Description
   - ☐ Syllabus
   - ☐ Pre-requisites or co-requisites

Date: 11/27/2020
Dept: SHIH **College:** SME
Program: MS IH & MS IH DL/PT **CRC Representative:** Theresa Stack

Description of Request: Update the Advanced Ergonomics course with a name change, course description change, and an additional credit.

Current Course or Program Information: I.H. 5686 - Advanced Ergonomics

2 credits (Hrs: 2 Lec.)

Methods used for conducting ergonomic analysis and studies are addressed. The emphasis is on occupational applications of ergonomics, particularly hazards associated with manual material handling and highly repetitive motions. The course assumes students have completed an introductory course in ergonomics.

Proposed Change

Course # Name	**Credits**
Pre-req.	
IH 5686 – Ergonomics for Industrial Hygienists	**3 credits (Hrs 3 Lec.)**

This course covers the use of ergonomic principles to anticipate, recognize, evaluate, and control workplace conditions that cause or contribute to musculoskeletal and nerve disorders. Course topics include work physiology, anthropometry, upper and lower musculoskeletal disorders, computer workstations, material handling, hand tool selection, vibration, and program development. Examination of high-risk industries and their specific needs as well as the selection and application of appropriate methods to different settings and industries is covered.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

The course is taught on campus and via distance learning. The legacy course, 2009, was conceptualized as a follow-on course to the OSH undergraduate Ergonomics course covering only advanced ergonomic methods. The scope and content of the course no longer meets this model. 90% of the MS students have little to no background in ergonomics, therefore it is necessary to cover the foundational principles addition to qualitative and quantitative assessment methods. Thirty-five percent of all injuries are related to ergonomics highlighting the importance in the field of IH.

MS Distance student evaluations revealed the density of the current material for a 2-credit class was dense and others were disappointed because of topics not covered. There are several topics not covered in the course that are necessary for the practice of ergonomics in an occupational setting. The topics not covered justify the additional credit hour.

Anticipated Impacts to "Other" Programs

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Program changes to MS IH and MS IH DL/PT addressed separately.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect: May 2020 for Summer 2021 classes. 2021-2022 catalogue update

Syllabus

Instructor information:

Theresa Stack, MS, CSP, CPE
Email: tstack@mtech.edu
Office: Science and Engineering, Rm 322, Phone: 406-496-4871, Cell: 406-451-1749
See Moodle website or LinkedIn for background on instructor's qualifications.

Course Description:

This course covers the use of ergonomic principles to anticipate, recognize, evaluate, and control workplace conditions that cause or contribute to musculoskeletal and nerve disorders. Course topics include work physiology, anthropometry, upper and lower musculoskeletal disorders, computer workstations, material handling, hand tool selection, vibration, and program development. Examination of high-risk industries and their specific needs as well as the choice and application of appropriate methods to different settings and industries is covered.

Prerequisites and Co-requisites:

Prerequisite:	Recommended:
Graduate standing	Human Anatomy & Physiology I and II,

Textbooks / Materials:

Required: Occupational Ergonomics: A Practical Approach by Stack and Ostrom, Publisher Wiley
ISBN-13: 978-1118814215, ISBN-10: 1118814215

Student Outcomes:

Student outcomes are descriptions of what students are expected to know and be able to do by the time of course completion they include:

- Demonstrate an understanding of the fundamental aspects of ergonomics/human factors.
- Understand the philosophy of protecting and enhancing employee health by using ergonomic principles to select tools, equipment, and systems to match human capabilities and limitations.

ABET Specific:

- 1.a Identify and solve a defined, technical industrial hygiene problem using applied science and math knowledge (HW 5)
- 1.c Conduct qualitative and quantitative hazard exposure assessment (select questions from exam I)
- 2.b Design a procedure to address an industrial hygiene related need (HW 4)
- 7.b Produce a thesis or publishable report that demonstrates both mastery of the subject matter and a high level of communication skills. (Final Paper)

Tentative Schedule & Topics Covered

Week	Text Chapter	Topic
1	2	Welcome / Course Overview / Handouts Introduction to Ergonomics* Physical Work Place Risk Factors

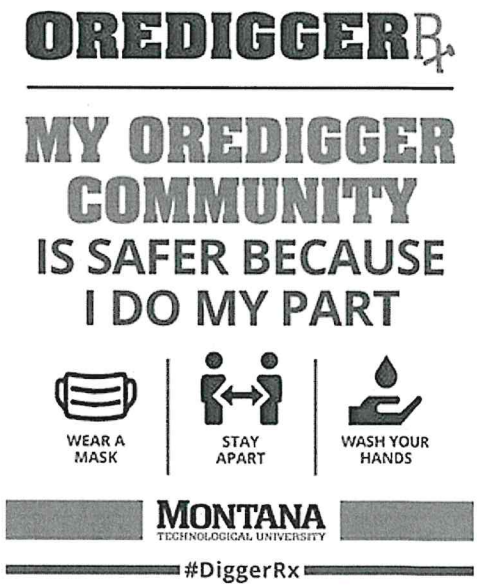
2	3	Anthropometry HW 1 Who are you and 2 The Invisible Woman Due
3	13 & 11	Upper Extremities Work Station Design HW 3 Do you believe due
4		HW 5. Anthro and Workstation Lab
5	See Moodle	Anthropometry and Workstation Lab HW 4 Identify a process and select evaluation tools (due week 9)
6	7 & 13	Human Spine and Work Biomechanics HW 5 Anthropometry and Workstation Lab due
7	14	HW 6 Biomechanics Lab Due HW 7 Lifting Lab Rula/Reba
8	14	HW 8 Rula Reba Lab HW 7 Lifting Lab Due Hand Tools and Hand Tool lab
9	9 & 10	Review HW 8 Rula Reba Due Exam
10		Human Tech Assessment Tool Human Vibration
11	12	Vibration Lab MMH
12		Office and Work from Home HW 9 Vibration lab
13	7	Psychophysics and quantitative methods HW 9 Perceptions
14		Making a business case for safety Ergonomics in Health Care
15		Ergonomics and industry 4.0
16		Final Paper Due Peer Review

Grading Criteria and Scale

Late submittals are highly discouraged and will be penalized. Late submissions are not accepted for forum posts, exams, in-class activities, and end of the semester final project.

Activity	Points
HW 1 Who are you	10
HW 2 Invisible Women	15
HW 3 Do you believe	40
HW 4 Identify Project	15 *
HW 5 Anthro Lab	25
HW 6 Bio Lab	40
HW 7 Lifting Lab	40
HW 8 Almond Sorting	10
HW 9 Vibration	25
	220 points
Exam	100
Peer Review	10
Presentation	20
Paper	100
	230 points
Total	450 Max Points

Highest	Lowest	Letter
100.00 %	93.00 %	A
92.99 %	90.00 %	A-
89.99 %	87.00 %	B+
86.99 %	83.00 %	B
82.99 %	80.00 %	B-
79.99 %	77.00 %	C+
76.99 %	73.00 %	C
72.99 %	70.00 %	C-
69.99 %	67.00 %	D+
66.99 %	60.00 %	D
59.99 %	0.00 %	F



The instructor makes every effort to complete grading within ten business days of the due date. The instructor also makes every effort to document grades accurately, but the **student is responsible** for tracking their grades on **Moodle.**

Grade Appeal Policy & Procedure: When a student believes a grade has been improperly recorded by a faculty member, the following procedural steps for an informal appeal are to be followed. The "burden of proof" in the grade appeals process shall rest with the student. Regardless of the circumstance,

- the student must attempt to resolve the matter with the course instructor within **14 days** after the grade is posted to the student's file.

- If a mutually satisfactory resolution to the problem cannot be reached, the student may request in writing that the Department Chair convenes in a meeting with the student and the course instructor. This will typically occur within 14 days of the written request.
- If a Department Chair or Dean is the instructor involved in the appeal, the student may request in writing that the Vice Chancellor for Academic Affairs appoint another Department Chair or Dean to convene the informal meeting.
- If the grade issue is not resolved at this meeting, the student may request a formal grade appeal.

Administrative Matters:

Missed deadlines: Exams cannot be taken early or made up without prior approval of the instructor. Under cases of a medical emergency, the instructor will consider excuses on a case-by-case basis, and work with individual students to facilitate making up the activity. Making up required activities is a privilege, not a right.

Academic honesty: Dishonesty includes cheating, plagiarism, forgery, falsification, facilitation or adding academic dishonesty; multiple submissions, theft of instructional material or tests; unauthorized access to, manipulation of or tampering with laboratory equipment, experiments or computer program without proper authorization; alternation of grades or files; misuse of research data in reporting results; use of personal relationships to gain grades or favors, any action intended to gain an academic advantage by fraudulent and or deceptive means. **The student** has full responsibility for the content and integrity of all academic work submitted. Ignorance or a rule does not constitute a basis for waiving the rule or the consequence of that rule. Students unclear about a specific situation should ask their instructor, who will explain what is and is not acceptable. Academic misconduct will be handled by the Vice-Chancellor for Academic Affairs and will result in a zero score on an exam or assignment, possibly a failing grade in the class.

Classroom behavior policy: Comments during class, written or oral, must avoid offending any other students regarding race, ethnicity, religious beliefs, sexual preference, and political opinions. Please keep the language clean.

Classroom behavior includes the on-line presence. Review Moodle for Tips.

Disabilities: Students with disabilities who believe they may need accommodations in this class are encouraged to contact a Montana Tech Disability Services Coordinator (DSC) at either 496-4429 (North Campus) or 496-3730 (South Campus). Please obtain from them a letter from a Montana Tech Disability Coordinator authorizing your accommodations is needed. Exams administered by TRIO.

COVID-19 accommodations: OreDiggerRX Web Link

When students miss class or expect to miss due to a medical issue this fall, they will be asked to contact OrediggerRx (orediggerRx@mtech.edu). Once a student has contacted OrediggerRX, staff will inform the student's instructor(s) of the attendance status of the student. Students who will be missing class are strongly encouraged to contact their instructors, but if they do not, OrediggerRX ensures that faculty are kept informed of the status of students.

Revisions: The instructor reserves the right to change the syllabus at any time. Changes appear in red.

Class Expectations

Course Expectations:

- Students are encouraged to attend all scheduled class sessions. Your participation is needed for learning and practice. Please turn off cell phones or set to vibrate and no text messaging during class. If you must take or make a call, please leave the class.
- When sending email or a text to me, please address me by name (Theresa or Prof. Stack), identify the topic and the course number in the subject, and include your name

MontanaTech

Curriculum Change Request Form Dated August 15, 2020

APPROVALS

Department Head Approval _____ Date 2-22-21

Dean Approval _____ Date 3-1-21

Graduate Council Approval _____ Date 3/26/21

CRC Approval _____ Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date 3/26/21

Chancellor Approval (see below) _____ Date _____

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   XCourse Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
   - ☐ Course Number
   - ☐ Course Outcomes
   - ☐ Course Description
   - ☐ Syllabus
   - ☐ Pre-requisites or co-requisites
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

X Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:

- ☐ **Documents as listed under establishing a new course (as applicable)**
- ☐ Existing Curriculum Worksheet
- ☐ New Curriculum Worksheet, with changes highlighted

☐ Other (for those that are considered in this level but otherwise not listed):

_____

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date: 1/21/21
Dept: SHIH **College:** SME
Program: MS IH Distance Learning/Prof Track **CRC Representative:** Theresa Stack

Description of Request: Amend the MS IH Distance Learning/Professional Track curriculum to reflect the following changes: 1) IH 5686 - Advanced Ergonomics changed from two to three credits and the name revised to Ergonomics for Industrial Hygienists, 2) IH 5986 - Comprehensive Exam changed from three credits to two credits, 3) IH 5286 revised to reflect a separate summer lab residency course (IH 5326), 4) inclusion of IH 5086 –Aerosol Science as a three credit elective, 5) IH 5156 – Noise course name revised to Occupational and Environmental Noise, and 6) revise published electives offerings to reflect current courses.

Current Course or Program Information: Current curriculum form is attached.

Proposed Change

Curriculum form reflecting the following changes is attached with changes highlighted. These changes do not result in any total credit changes for the MS IH Distance Learning/Professional Track Degree.
The MS IH Distance Learning/Professional Track curriculum is revised to reflect 1) revision of IH 5686, Advanced Ergonomics from two to three credits and a name change to Ergonomics for Industrial Hygienists, 2) revision of IH 5986, Comprehensive Exam from three credits to two credits, 3) revision of IH 5286 to reflect a separate summer lab residency course (IH 5326) 4) inclusion of IH 5086 – Aerosol Science as a three credit elective, 5) IH 5156 – Noise course name revised to Occupational and Environmental Noise, and 6) revise published electives offerings to reflect current courses.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request Our ANSAC/ABET continuous improvement process revealed that these changes more accurately reflect the workload associated with specific courses. In addition, separation of the summer lab residency provides a more accurate description in the catalog. The revision of potential electives section reflects revisions to available electives since our last catalog update.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect:. 2021-2022 catalog update which is in effect Summer, 2021.

APPROVALS

Department Head Approval _____
Date 2-22-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date 3/26/21

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date 3/26/21

Chancellor Approval (see below) _____
Date _____

[ARCHIVED CATALOG]

Industrial Hygiene Distance Learning/Professional Track, M.S.

Return to {$returnto_text} Return to: Academic Programs

Program Manager: Dr. Terry Spear

(406) 496-4897

Office: SE 325

Field of Study

The Montana Tech Industrial Hygiene Distance Learning/Professional Track graduate program provides an exceptional opportunity for advanced study in the field of occupational health. This program brings graduate education in industrial hygiene to working professionals with the overall goal of providing the technical competence to anticipate, recognize, evaluate, and control occupational health hazards. The distance M.S. degree is structured to encourage participative, collaborative, and applied problem-solving strategies to address modern day occupational health issues.

Graduate Admission Requirements

Applicants are admitted on a basis of acceptable undergraduate academic preparation and work experience. Applicants must have a bachelor's degree from a regionally accredited college or university that included as a minimum 19 credits of college-level mathematics and science, (including first semester calculus and statistics), biology (including anatomy/physiology), chemistry (including organic chemistry), and physics.

Applicants with a bachelor's degree from a regionally accredited college or university may alternatively demonstrate adequate math and science preparation if they hold the Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), Certified Professional Ergonomist (CPE), or Certified Health Physicist (CHP) credential, or *equivalent international professional certifications, or if they have completed an advanced degree in a science-based discipline.

Two years of safety and health-related work experience is also a requirement for admittance to this program. The GRE exam is not required for the industrial hygiene distance learning students.

*these equivalent international professional certifications must be reviewed and approved by the IH Distance Learning/Professional Track Program Manager on a case-bycase basis.

Program Educational Objectives (Move to end of catalog)

Program Educational Objectives (PEOs) are broad statements that describe what graduates are expected to attain within a few years after graduation. The M.S. Industrial Hygiene Distance Learning/Professional Track degree program has adopted the following three PEOs.

PEO 1. Be prepared to enhance their IH-related careers throughout the first four years after graduating.

PEO 2. Use their education to expand their professional competence to provide IH services appropriate to their employment.

PEO 3. Act professionally by engaging in career development, recognizing ethical responsibilities, supporting the profession, and being an informed and involved member of their community.

Student Outcomes - (Revise and move to end of catalog after PEOs)

Student outcomes are statements of what each graduate of the program is expected to achieve at the time of graduation. The M.S. Industrial Hygiene Distance Learning/Professional Track curriculum is structured so each student will have obtained the knowledge, understanding and skills in all ~~22~~ 14 student outcomes.

~~Apply knowledge of mathematics, science and applied sciences.~~

~~Design and conduct common experiments and analyze and interpret data.~~

~~Formulate or design a system, process or program to meet desired needs.~~

~~Function on multidisciplinary teams.~~

~~Identify and solve applied science problems, including advanced qualitative and quantitative problems.~~

~~Understand professional and ethical responsibilities related to the IH profession.~~

~~Communicate effectively.~~

~~Understand the impact of solutions in a global and societal context.~~

~~Recognize the need for and have the ability to engage in life-long learning.~~

~~Knowledge of contemporary issues.~~

~~Use the techniques, skills, and modern scientific and technical tools necessary for the practice of IH.~~

~~Complete a project or research activity resulting in a report that demonstrates mastery of the subject matter and a high level of communication skills.~~

~~Identify agents, factors and stresses generated by and/or associated with defined sources, unit operations, and processes.~~

~~Describe qualitative and quantitative aspects of generation of agents, factors, and stresses.~~

~~Understand the physiological and/or toxicological interactions of the physical, chemical, biological and ergonomic agents, factors, and/or stressors with the human body.~~

~~Assess qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.~~

~~Calculate, interpret and apply statistical and epidemiological data.~~

~~Recommend and evaluate engineering, administrative and personal protective equipment controls and/or other interventions to reduce or eliminate hazards.~~

~~Demonstrate an understanding of applicable business and managerial practices~~

~~Interpret and apply applicable occupational and environmental regulations~~

~~Understand the fundamental aspects of safety and environmental health~~

~~Attain recognized professional certification~~

1. An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipling.
2. An ability to formulate or design a system, process, procedure or program to meet desired needs.
3. An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.

4. An ability to communicate effectively with a range of audiences.
5. An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
6. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.
7. One year of study beyond the baccalaureate level and a project or research activity resulting in a report that demonstrates both the mastery of the subject matter and a high level of communication skills.
8. Physiological and/or toxicological interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.
9. Anticipation, recognition, evaluation, and control of potentially hazardous agents, conditions and practices.
10. Fundamental exposure assessment techniques (both qualitative and quantitative).
11. Industrial hygiene data interpretation including statistical and epidemiological principles.
12. Applicable business and managerial practices.
13. Occupational and environmental standards and regulations.
14. Fundamental aspects of safety and environmental health.

M.S. Industrial Hygiene Distance Learning/Professional Track (37 Credits)

Core Requirements (28 Credits)

OSH 421 - IH I - Chemical & Biological Hazards[1] 3 credits

OSH 422 - IH II - Physical Hazards[1] 3 credits

I.H. 5286 - Sampling & Evaluation Of Health Hazards[1] (Distance Learning Students Only) 2 Credits Spring Semester ~~1 Credit Summer Semester 1~~

I.H. 5326 Sampling & Evaluation of Health Hazards Lab Residency[1,2] 1 credit Summer Semester

I.H. 5276 - Advanced Industrial Toxicology 3 credits

I.H. 5686 - ~~Advanced~~ Ergonomics for Industrial Hygienists ~~2~~ 3 credits

I.H. 5426 - Principles of Epidemiology 3 credits

I.H. 5136 - Industrial Hygiene Management 2 credits

I.H. 5076 - Statistical Analysis 3 credits

I.H. 5606 - Systems Safety & Process Safety Management[1] 3 credits

I.H. 5986 - Comprehensive Written & Oral Exam[3] ~~3~~ 2 credits

Note(s)

~~1 Five-day on-campus laboratory required.~~

[1] Graduate students with a B.S. Degree in OSH from Montana Tech have taken these courses, but will be required to complete 9 elective credits to replace the 9 core credits. These students also have an adequate background in safety and will be required to complete an additional 3 credit elective.

[2]Distance Learning students must complete a 5 day on-campus laboratory as part of IH 5326.

IH 5326 prerequisites: IH 5286
IH 5286 prerequisites: OSH 421 and OSH 422

[3]Prior to registering for IH 5986, Comprehensive Written & Oral Examination, all deficiency credits must be completed. In addition, all MS IH coursework must be completed, or be completed concurrently with IH 5986 during the final semester of study.

Electives (9 Credits)

~~OSH 406 - Small Particle Technology 2 credits~~

I.H. 5086 – Aerosol Science 3 credits

I.H. 524 – Advanced Environmental Health 3 credits

I.H. 5156 - ~~Noise~~ Occupational & Community Noise 3 credits

I.H. 5166 - Advanced Industrial Ventilation 3 credits

I.H. 5476 - Strategies for Occupational Exposure Assessment 3 credits

I.H. 5676 - Respiratory Protection 3 credits

I.H. 5626 - Radiological Health & Safety 3 credits

I.H. 5976 - Special Problems 1 - 4 credits (Variable)

Note(s)

Students licensed as certified industrial hygienists (CIH), may waive OSH 4216, Industrial Hygiene I, and these students would be required to complete 34 credits for the online industrial hygiene degree. Students licensed as certified safety professionals (CSP), may waive I.H. 5606 - Systems Safety & Process Safety Management, and these students would be required to complete 34 credits for the online industrial hygiene degree. For students licensed as both CIH and CSP, OSH 4216 and I.H. 5606 may be waived, and these students would be required to complete 31 credits for the online industrial hygiene degree.

Examinations

Candidates for a master's degree must complete a written and oral exam that is focused on student outcomes related to core curriculum requirements.

Laboratories

M.S. Industrial Hygiene Distance Learning/Professional Track students must complete a five (5) day on-campus laboratory as part of I.H. ~~5286~~ 5326.

Return to {$returnto_text} Return to: Academic Programs

MontanaTech

Master of Science in Industrial Hygiene (MS IH)

DISTANCE LEARNING/PROFESSIONAL TRACK GRADUATE PROGRAM

Accredited by the Applied Natural Science Accreditation Commission of ABET http://www.abet.org

REQUIRED COURSES (28 credits)

Course #	Title of Course	Term	Credits
OSH 421	Industrial Hygiene I [1]		3
OSH 422	Industrial Hygiene II [1]		3
I.H. 5076	Statistical Analysis		3
I.H. 5136	Industrial Hygiene Management		2
I.H. 5276	Advanced Industrial Toxicology		3
I.H. 5286	Sampling and Evaluation of Health Hazards Lecture[1]		2
I.H. 5326	Sampling and Evaluation of Health Hazards Lab Residency * [1]		1
I.H. 5426	Principles of Epidemiology		3
I.H. 5606	Systems Safety and Process Safety Management [1]		3
I.H. 5686	~~Advanced~~ Ergonomics for Industrial Hygienists		~~2~~ 3
I.H. 5986	Comprehensive Exam**		~~3~~ 2
	Total Core Credits for MS IH Distance Learning		28

[1] Graduate students with a B.S. Degree in OSH from Montana Tech have taken these courses but will be required to complete 9 elective credits to replace the 9 core credits. These students also have an addequate background in safety and will be required to complete an additional 3 credit elective.

*Distance Learning students must complete a 5 day on-campus laboratory as part of IH 5326

IH 5286 prerequisites: IH 5326
OSH 421 and OSH 426

**All deficiency credits must be completed prior to registering. In addition, all MS IH coursework must be be completed or be completed concurrently with 5986 during final semester of study.

POTENTIAL ELECTIVE COURSES (at least 9 credits)

Course #	Title of Course	Term	Credits
I.H. 5086	Aerosol Science		3
I.H. 5166	Advanced Industrial Ventilation		3
I.H. 5156	~~Noise~~ Occupational and Community Noise		3
I.H. 5246	Advanced Environmental Health		3
I.H. 5476	Strategies for Occupational Exposure Assessment		3
I.H. 5626	Radiological Health and Safety		3
I.H. 5676	Industrial Respiratory Protection		3
I.H. 5976	Special Problems		3
	TOTAL CREDITS - MS IH DISTANCE LEARNING		37

UPDATED 3/24/21

MS IH Campus

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*

   X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:

   - ☐ Course Number
   - ☐ Course Outcomes
   - ☐ Course Description
   - ☐ Syllabus
   - ☐ Pre-requisites or co-requisites

Date: 11/27/2020
Dept: SHIH
College: SME
Program: MS IH & MS IH DL/PT
CRC Representative: Theresa Stack

Description of Request: Update the Advanced Ergonomics course with a name change, course description change, and an additional credit.

Current Course or Program Information: I.H. 5686 - Advanced Ergonomics

2 credits (Hrs: 2 Lec.)

Methods used for conducting ergonomic analysis and studies are addressed. The emphasis is on occupational applications of ergonomics, particularly hazards associated with manual material handling and highly repetitive motions. The course assumes students have completed an introductory course in ergonomics.

Proposed Change

Course # Name	**Credits**
Pre-req.	
IH 5686 – Ergonomics for Industrial Hygienists	**3 credits (Hrs 3 Lec.)**

This course covers the use of ergonomic principles to anticipate, recognize, evaluate, and control workplace conditions that cause or contribute to musculoskeletal and nerve disorders. Course topics include work physiology, anthropometry, upper and lower musculoskeletal disorders, computer workstations, material handling, hand tool selection, vibration, and program development. Examination of high-risk industries and their specific needs as well as the selection and application of appropriate methods to different settings and industries is covered.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

The course is taught on campus and via distance learning. The legacy course, 2009, was conceptualized as a follow-on course to the OSH undergraduate Ergonomics course covering only advanced ergonomic methods. The scope and content of the course no longer meets this model. 90% of the MS students have little to no background in ergonomics, therefore it is necessary to cover the foundational principles addition to qualitative and quantitative assessment methods. Thirty-five percent of all injuries are related to ergonomics highlighting the importance in the field of IH.

MS Distance student evaluations revealed the density of the current material for a 2-credit class was dense and others were disappointed because of topics not covered. There are several topics not covered in the course that are necessary for the practice of ergonomics in an occupational setting. The topics not covered justify the additional credit hour.

Anticipated Impacts to "Other" Programs

Program changes to MS IH and MS IH DL/PT addressed separately.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect: May 2020 for Summer 2021 classes. 2021-2022 catalogue update

Syllabus

Instructor information:

Theresa Stack, MS, CSP, CPE
Email: tstack@mtech.edu
Office: Science and Engineering, Rm 322, Phone: 406-496-4871, Cell: 406-451-1749
See Moodle website or LinkedIn for background on instructor's qualifications.

Course Description:

This course covers the use of ergonomic principles to anticipate, recognize, evaluate, and control workplace conditions that cause or contribute to musculoskeletal and nerve disorders. Course topics include work physiology, anthropometry, upper and lower musculoskeletal disorders, computer workstations, material handling, hand tool selection, vibration, and program development. Examination of high-risk industries and their specific needs as well as the choice and application of appropriate methods to different settings and industries is covered.

Prerequisites and Co-requisites:

Prerequisite:	Recommended:
Graduate standing	Human Anatomy & Physiology I and II,

Textbooks / Materials:

Required: Occupational Ergonomics: A Practical Approach by Stack and Ostrom, Publisher Wiley
ISBN-13: 978-1118814215, ISBN-10: 1118814215

Student Outcomes:

Student outcomes are descriptions of what students are expected to know and be able to do by the time of course completion they include:

- Demonstrate an understanding of the fundamental aspects of ergonomics/human factors.
- Understand the philosophy of protecting and enhancing employee health by using ergonomic principles to select tools, equipment, and systems to match human capabilities and limitations.

ABET Specific:

- 1.a Identify and solve a defined, technical industrial hygiene problem using applied science and math knowledge (HW 5)
- 1.c Conduct qualitative and quantitative hazard exposure assessment (select questions from exam I)
- 2.b Design a procedure to address an industrial hygiene related need (HW 4)
- 7.b Produce a thesis or publishable report that demonstrates both mastery of the subject matter and a high level of communication skills. (Final Paper)

Tentative Schedule & Topics Covered

Week	Text Chapter	Topic
1	2	Welcome / Course Overview / Handouts Introduction to Ergonomics* Physical Work Place Risk Factors

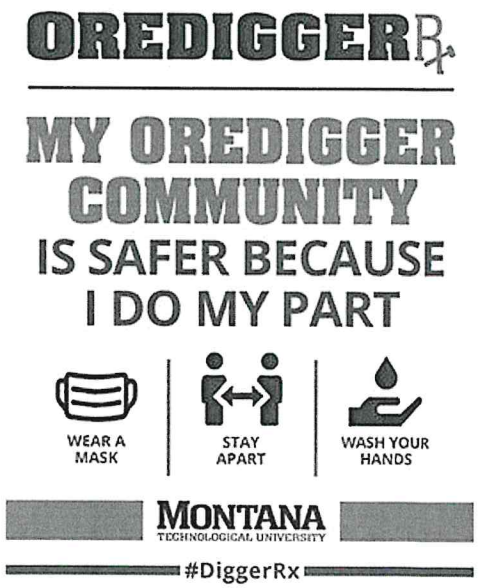
2	3	Anthropometry HW 1 Who are you and 2 The Invisible Woman Due
3	13 & 11	Upper Extremities Work Station Design HW 3 Do you believe due
4		HW 5. Anthro and Workstation Lab
5	See Moodle	Anthropometry and Workstation Lab HW 4 Identify a process and select evaluation tools (due week 9)
6	7 & 13	Human Spine and Work Biomechanics HW 5 Anthropometry and Workstation Lab due
7	14	HW 6 Biomechanics Lab Due HW 7 Lifting Lab Rula/Reba
8	14	HW 8 Rula Reba Lab HW 7 Lifting Lab Due Hand Tools and Hand Tool lab
9	9 & 10	Review HW 8 Rula Reba Due Exam
10		Human Tech Assessment Tool Human Vibration
11	12	Vibration Lab MMH
12		Office and Work from Home HW 9 Vibration lab
13	7	Psychophysics and quantitative methods HW 9 Perceptions
14		Making a business case for safety Ergonomics in Health Care
15		Ergonomics and industry 4.0
16		Final Paper Due Peer Review

Grading Criteria and Scale

Late submittals are highly discouraged and will be penalized. Late submissions are not accepted for forum posts, exams, in-class activities, and end of the semester final project.

Activity	Points
HW 1 Who are you	10
HW 2 Invisible Women	15
HW 3 Do you believe	40
HW 4 Identify Project	15 *
HW 5 Anthro Lab	25
HW 6 Bio Lab	40
HW 7 Lifting Lab	40
HW 8 Almond Sorting	10
HW 9 Vibration	25
	220 points
Exam	100
Peer Review	10
Presentation	20
Paper	100
	230 points
Total	450 Max Points

Highest	Lowest	Letter
100.00 %	93.00 %	A
92.99 %	90.00 %	A-
89.99 %	87.00 %	B+
86.99 %	83.00 %	B
82.99 %	80.00 %	B-
79.99 %	77.00 %	C+
76.99 %	73.00 %	C
72.99 %	70.00 %	C-
69.99 %	67.00 %	D+
66.99 %	60.00 %	D
59.99 %	0.00 %	F



The instructor makes every effort to complete grading within ten business days of the due date. The instructor also makes every effort to document grades accurately, but the **student is responsible** for tracking their grades on **Moodle.**

Grade Appeal Policy & Procedure: When a student believes a grade has been improperly recorded by a faculty member, the following procedural steps for an informal appeal are to be followed. The "burden of proof" in the grade appeals process shall rest with the student. Regardless of the circumstance,

- the student must attempt to resolve the matter with the course instructor within **14 days** after the grade is posted to the student's file.

- If a mutually satisfactory resolution to the problem cannot be reached, the student may request in writing that the Department Chair convenes in a meeting with the student and the course instructor. This will typically occur within 14 days of the written request.
- If a Department Chair or Dean is the instructor involved in the appeal, the student may request in writing that the Vice Chancellor for Academic Affairs appoint another Department Chair or Dean to convene the informal meeting.
- If the grade issue is not resolved at this meeting, the student may request a formal grade appeal.

Administrative Matters:

Missed deadlines: Exams cannot be taken early or made up without prior approval of the instructor. Under cases of a medical emergency, the instructor will consider excuses on a case-by-case basis, and work with individual students to facilitate making up the activity. Making up required activities is a privilege, not a right.

Academic honesty: Dishonesty includes cheating, plagiarism, forgery, falsification, facilitation or adding academic dishonesty; multiple submissions, theft of instructional material or tests; unauthorized access to, manipulation of or tampering with laboratory equipment, experiments or computer program without proper authorization; alternation of grades or files; misuse of research d ata in reporting results; use of personal relationships to gain grades or favors, any action intended to gain an academic advantage by fraudulent and or deceptive means. **The student** has full responsibility for the content and integrity of all academic work submitted. Ignorance or a rule does not constitute a basis for waiving the rule or the consequence of that rule. Students unclear about a specific situation should ask their instructor, who will explain what is and is not acceptable. Academic misconduct will be h andled by the Vice-Chancellor for Academic Affairs and will result in a zero score on an exam or assignment, possibly a failing grade in the cla ss.

Classroom behavior policy: Comments during class, written or oral, must avoid offending any other students regarding race, ethnicity, religious beliefs, sexual preference, and political opinions. Please keep the language clean.

Classroom behavior includes the on-line presence. Review Moodle for Tips.

Disabilities: Students with disabilities who believe they may need accommodations in this class are encouraged to contact a Montana Tech Disability Services Coordinator (DSC) at either 496-4429 (North Campus) or 496-3730 (South Campus). Please obtain from them a letter from a Montana Tech Disability Coordinator authorizing your accommodations is needed. Exams administered by TRIO.

COVID-19 accommodations: OreDiggerRX Web Link

When students miss class or expect to miss due to a medical issue this fall, they will be asked to contact OrediggerRx (orediggerRx@mtech.edu). Once a student has contacted OrediggerRX, staff will inform the student's instructor(s) of the attendance status of the student. Students who will be missing class are strongly encouraged to contact their instructors, but if they do not, OrediggerRX ensures that faculty are kept informed of the status of students.

Revisions: The instructor reserves the right to change the syllabus at any time. Changes appear in red.

Class Expectations

Course Expectations:

- Students are encouraged to attend all scheduled class sessions. Your participation is needed for learning and practice. Please turn off cell phones or set to vibrate and no text messaging during class. If you must take or make a call, please lea ve the class.
- When sending email or a text to me, please address me by name (Theresa or Prof. Stack), identify the topic and the course number in the subject, and include your name

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

APPROVALS

Department Head Approval _____ Date 2-21-21

Dean Approval _____ Date 3-1-21

Graduate Council Approval _____ Date 3/26/21

CRC Approval _____ Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date 3/26/21

Chancellor Approval (see below) _____ Date _____

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*

   X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
   - ☐ Course Number
   - ☐ Course Outcomes
   - ☐ Course Description
   - ☐ Syllabus
   - ☐ Pre-requisites or co-requisites
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

   ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
   - ☐ **Documents as listed under establishing a new course (as applicable)**
   - ☐ Existing Curriculum Worksheet
   - ☐ New Curriculum Worksheet, with changes highlighted

☐ Other (for those that are considered in this level but otherwise not listed):

_____

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date: 1/26/2021
Dept: SHIH
Program: MS Industrial Hygiene
College: SME
CRC Representative: Theresa Stack

Description of Request: Revise the course title of IH 5156 – Noise (3 credits) to IH 5156 - Occupational and Community Noise (3 credits). In addition, revise description to clarify what is being taught in the course. Finally, revise the prerequisite to "Graduate standing or consent of instructor" to match other course prerequisites in the program. This course is an elective in the IH program.

Current Course or Program Information: IH 5156 Noise

3 Credits Fall Semester (Hrs: 3 Lec.)

Designed to familiarize students with the evaluation and control of noise. Emphasizes the selection of appropriate evaluation techniques, instruments, analysis of data, and design of adequate and cost-effective controls.
Prerequisite: PHSX 123 and Graduate Standing or Consent of Instructor. Course generally offered 1st semester.

Proposed Change

Course # Name
Credits Pre-req.
IH 5156 Occupational and Community Noise 3 cr, prerequisite: Graduate standing or consent of instructor.
This course is designed to familiarize students with the evaluation and control of occupational and environmental noise. The physics of sound, mechanisms of hearing loss, selection of appropriate noise evaluation techniques, instruments, analysis of data, and design and selection of noise controls are emphasized.

List of supporting documentation attached (See Level of Request for Requirements):

- Revised Syllabus
- Revised Curriculum Worksheet, with highlighted changes

Assessment Leading to Request The course title and description are being changed to more accurately reflect what is being taught in the course. The prerequisite change is being changed to align better with prerequisites of other courses in the IH program.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: No consultation is required

Date to take effect:. 2021-2022 catalog update which is in effect Summer, 2021.

APPROVALS

Department Head Approval [signature] 2-22-21
Date _____

Dean Approval [signature]
Date 3-1-21

Graduate Council Approval [signature]
Date 3/26/21

CRC Approval
Date _____

Faculty Senate Approval
Date _____

VCAA Approval (see below) [signature]
Date 3/26/21

Chancellor Approval (see below)
Date _____

IH 5156 – OCCUPATIONAL AND COMMUNITY NOISE (3 Credits)

Instructor

Dan Autenrieth, PhD, CIH, CSP
Contact Information: dautenrieth@mtech.edu ; (406) 496-4339 ; S&E Building Room 326

Introduction

This course is designed to familiarize students with the evaluation and control of occupational and environmental noise. The physics of sound, mechanisms of hearing loss, selection of appropriate noise evaluation techniques, instruments, analysis of data, and design and selection of noise controls are emphasized.

Course Objectives

After successfully completing this course, the student will be able to:

- Identify and describe the structures and function of the human ear
- Describe the impact that hazardous noise can have on hearing
- Describe the physical nature of noise, manipulate the relationships between power, intensity, and pressure and relate them to damage risk potential (hearing loss or other risk) for exposure to noise in the occupational environment
- Anticipate, recognize, evaluate, and control occupational and community noise
- Interpret noise monitoring results as they relate to relevant standards
- Describe and apply the principles of noise reduction at sources, receivers, and in the path between sources and receivers in a variety of exposure scenarios

Grading

This course is graded on a points-earned basis with the following weight given to each grading category:

- Examinations: 4 totaling 40% of your final grade
- Homework assignments: 10 totaling 60% of your final grade (2 lowest are dropped)

Grades will be assigned according to the following:

- A = 92.51% to 100%
- A- = 89.51% to 92.50%
- B+ = 86.51% to 89.50%
- B = 82.51% to 86.50%
- B- = 79.51% to 82.50%
- C+ = 76.51% to 79.50%
- C = 72.51% to 76.50%
- C- = 69.51% to 72.50%
- D+ = 66.51% to 69.50%
- D = 62.51% to 66.50%
- D- = 59.51% to 62.50%
- F = 59.50% or less

In addition, the following requirements shall be strictly adhered to:

- Percentages will be computed to two decimal places and rounded to the nearest whole number (X.50 will be rounded down to X; X.51 will be rounded up).
- Assignment due-date times are at 11:59 PM on the scheduled due date (see pages 5 and 6 for assignment due dates).
- Late assignments will be penalized by a 10 percent grade reduction per day except for prior arrangements or in the case of extraordinary circumstances beyond the control of the student.

Textbook

- Brazile, B., Autenrieth, D.: Occupational and Community Noise: A Guide for Environmental Health and Safety Students. Kendall Hunt Publishing Company, Dubuque, IA (2017).

https://he.kendallhunt.com/product/occupational-community-noise-guide-environmental-health-safety-students

Examinations

There will be four examinations administered in this course, each worth 10 percent of your final grade (40% total).

Homework Assignments

There will be 10 total homework assignments. The highest eight will count toward your grade at 7.5% each (60% total), and the lowest two will be dropped. Homework assignments consist mainly of individual noise-related practice problems.

Academic Honesty and Dishonesty

Academic honesty is expected of all our students at all times. For more information on our policies related to academic honesty and dishonesty, please see the Montana Tech catalog at: https://catalog.mtech.edu/

ADA Statement

The Americans with Disabilities Act requires that reasonable accommodations be made for students with disabilities. If you need such assistance, please contact your instructor as soon as possible. Additional assistance can be found at: https://www.mtech.edu/disability/index.html

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted

X Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:

- ☐ **Documents as listed under establishing a new course (as applicable)**
- ☐ Existing Curriculum Worksheet
- ☐ New Curriculum Worksheet, with changes highlighted

☐ Other (for those that are considered in this level but otherwise not listed):

_____

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date: 1/21/21
Dept: SHIH
Program: MS Industrial Hygiene
College: SME
CRC Representative: Theresa Stack

Description of Request: Amend the MS Industrial Hygiene curriculum to reflect the following changes :1) IH 5686 - Advanced Ergonomics revised from two to three credits and the name revised to Ergonomics for Industrial Hygienists, 2) revise required core credit courses from 34 to 35 credits, 3) revise minimum elective course credits from three credits to two credits, 4) revise published elective offerings, and 5) IH 5156 – Noise course name revised to Occupational and Environmental Noise.

Current Course or Program Information: Current curriculum form is attached.

Proposed Change

Curriculum form reflecting the following changes is attached with changes highlighted. These changes do not result in any total credit changes for the MS Industrial Hygiene degree.
The MS IH curriculum is revised to reflect the following changes :1) IH 5686 - Advanced Ergonomics revised from two to three credits and the name revised to Ergonomics for Industrial Hygienists, 2) revise required core credit courses from 34 to 35 credits, 3) revise minimum elective course credits from three credits to two credits, 4) revise published elective offerings, and 5) IH 5156 – Noise course name revised to Occupational and Environmental Noise.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request Our ANSAC/ABET continuous improvement process revealed that these changes more accurately reflect the workload associated with specific courses. In addition, the available electives have changed since the last catalog update.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect:. 2021-2022 catalog update which is in effect Summer, 2021.

APPROVALS

Department Head Approval _____ 2-22-21
Date _____

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date 3/26/21

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date 3/26/21

Chancellor Approval (see below) _____
Date _____

Industrial Hygiene, M.S.

Return to {$returnto_text} Return to: Academic Programs

Program Manager: Dan Autenrieth

(406) 496-4339

Office: SE 326

Field of Study

Industrial hygienists play an important role in ensuring that the workplace is as free from hazards as possible and that the workers and the community at large are protected from potential health threats. Moreover, industrial hygienists work with management to anticipate problems that could occur and take action to prevent them before they happen. Also, industrial hygienists play an important role in shaping and implementing government policy concerning worker health and safety.

Job diversity is a major benefit to consider when choosing a career in the health/environmental sciences. A wealth of unique employment opportunities exists for industrial hygienists. Unlike many other professions, industrial hygienists are not limited to one particular type of industry. They are employed in a variety of organizations such as Public Utilities; Government; Academia; Research Laboratories; Hospitals; Insurance Companies; Consulting Firms; Oil, Chemical and Manufacturing Companies; and Mining Operations.

Graduate Admission Requirements

Applicants are admitted on a basis of acceptable undergraduate academic preparation, graduate record exam (GRE) scores and reference recommendations. Applicants must have a bachelor's degree from a regionally accredited college or university that included as a minimum 19 credits of college-level mathematics and science, (including first semester calculus and statistics), biology (including anatomy/physiology), chemistry (including organic chemistry), and physics.

Program Educational Objectives – (move to end of curriculum sheet)

Program Educational Objectives (PEOs) are broad statements that describe what graduates are expected to attain within a few years after graduation. The M.S. in Industrial Hygiene degree program has adopted the following three PEOs.

PEO 1. Establish their IH-related careers throughout the first four years after graduating.

PEO 2. Use their education to competently provide IH services appropriate to their employment.

PEO 3. Act professionally by engaging in career development, recognizing ethical responsibilities, supporting the profession, and being an informed and involved member of their community.

Student Outcomes – (Move after PEOs & revise to attached)

Student outcomes are statements of what each graduate of the program is expected to achieve at the time of graduation. The M.S. Industrial Hygiene curriculum is structured so each student will have obtained the knowledge, understanding and skills in all ~~22~~ 14 student outcomes.

~~Apply knowledge of mathematics, science and applied sciences.~~

~~Design and conduct common experiments and analyze and interpret data.~~

~~Formulate or design a system, process or program to meet desired needs.~~

~~Function on multidisciplinary teams.~~

~~Identify and solve applied science problems, including advanced qualitative and quantitative problems.~~

~~Understand professional and ethical responsibilities related to the IH profession.~~

~~Communicate effectively.~~

~~Understand the impact of solutions in a global and societal context.~~

~~Recognize the need for and have the ability to engage in life-long learning.~~

~~Knowledge of contemporary issues.~~

~~Use the techniques, skills, and modern scientific and technical tools necessary for the practice of IH.~~

~~Complete a project or research activity resulting in a report that demonstrates mastery of the subject matter and a high level of communication skills.~~

~~Identify agents, factors and stresses generated by and/or associated with defined sources, unit operations, and processes.~~

~~Describe qualitative and quantitative aspects of generation of agents, factors, and stresses.~~

~~Understand the physiological and/or toxicological interactions of the physical, chemical, biological and ergonomic agents, factors, and/or stressors with the human body.~~

~~Assess qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry.~~

~~Calculate, interpret and apply statistical and epidemiological data.~~

~~Recommend and evaluate engineering, administrative and personal protective equipment controls and/or other interventions to reduce or eliminate hazards.~~

~~Demonstrate an understanding of applicable business and managerial practices~~

~~Interpret and apply applicable occupational and environmental regulations~~

~~Understand the fundamental aspects of safety and environmental health~~

~~Attain recognized professional certification~~

1. An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipling.
2. An ability to formulate or design a system, process, procedure or program to meet desired needs.
3. An ability to develop and conduct experiments or test hypotheses, analyze, and interpret data and use scientific judgment to draw conclusions.
4. An ability to communicate effectively with a range of audiences.
5. An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
6. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.
7. One year of study beyond the baccalaureate level and a project or research activity resulting in a report that demonstrates both the mastery of the subject matter and a high level of communication skills.
8. Physiological and/or toxicological interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body.

9. Anticipation, recognition, evaluation, and control of potentially hazardous agents, conditions and practices.
10. Fundamental exposure assessment techniques (both qualitative and quantitative).
11. Industrial hygiene data interpretation including statistical and epidemiological principles.
12. Applicable business and managerial practices.
13. Occupational and environmental standards and regulations.
14. Fundamental aspects of safety and environmental health.

M.S. Industrial Hygiene (37 Credits)

Core Requirements (~~34~~ 35 Credits)

OSH 421 - IH I - Chemical & Biological Hazards 3 credits [1]

OSH 422 - IH II - Physical Hazards 3 credits[1]

I.H. 5076 - Statistical Analysis 3 credits

I.H. 5136 - Industrial Hygiene Management 2 credits

I.H. 5276 - Advanced Industrial Toxicology 3 credits

I.H. 5296 - Sampling & Evaluation of Health Hazards[1] ~~3~~ 2 credits

I.H. 5306 – Sampling & Evaluation of Health Hazards Lab[1] 1 credit

I.H. 5426 - Principles of Epidemiology 3 credits

I.H. 5686 - ~~Advanced~~ Ergonomics for Industrial Hygienists ~~2~~ 3 credits

I.H. 5946 - I.H. Graduate Seminar 1 credit

I.H. 5996 - Thesis Research 1 - 8 credits (Variable) (6 credits required)

ENGR 5940 - Engineering Seminar 1 credit

T.C. 5160 - Graduate Writing Seminar 1 credit

~~Safety Core 3 credits 2~~ I.H. 5606 – Systems Safety & Process Safety Management[2] 3 credits

Note(s)

[1] Graduate students with a B.S. degree in OSH from Montana Tech have taken these courses but will be required to complete 9 elective credits to replace the 9 core credits. [2]These students also have an adequate background in safety and will be required to complete an~~d~~ additional 3 credit elective.

~~2 Graduate students can choose from the following courses, or other approved courses, to satisfy the Safety Core requirement: OSH 427 Mining Safety; OSH 4956 Special Topics; I.H. 5606 Systems Safety & Process Safety Management.~~

Electives (at least ~~3~~ 2 Credits)

OSH 406 - Small Particle Technology 2 credits

OSH 407 – Small Particle Technology Lab 1 credit

OSH 416 - Industrial Ventilation 2 credits

OSH 424 – Environmental Health 3 credits

OSH 427 - Mining Safety 3 credits

OSH 444 – Law & Ethics for OSH 2 credits

~~OSH 4956 Behavior-Based Safety (3 credits)~~

I.H. 5156 - ~~Noise~~ Occupational & Community Noise 3 credits

I.H. 5476 - Strategies for Occupational Exposure Assessment 3 credits

I.H. 5676 - Respiratory Protection 3 credits

I.H. 5626 - Radiological Health & Safety 3 credits

I.H. 5976 - Special Problems 1 - 4 credits (Variable) (3 credits required)

Examinations

Candidates for a master's degree must present their thesis or publishable paper and pass an oral examination. The oral examination will focus on the thesis presentation or publishable paper, but may also include questions relating to the graduate study program.

MontanaTech

Master of Science in Industrial Hygiene (MS IH)

ON-CAMPUS GRADUATE PROGRAM

Accredited by the Applied Natural Science Accreditation Commission of ABET http://www.abet.org

REQUIRED COURSES (~~34~~ 35 credits)

Course #	Title of Course	Term	Credits
OSH 421	Industrial Hygiene I [1]		3
OSH 422	Industrial Hygiene II [1]		3
I.H. 5076	Statistical Analysis		3
I.H. 5136	Industrial Hygiene Management		2
I.H. 5276	Advanced Industrial Toxicology		3
I.H. 5296	Sampling and Evaluation of Health Hazards 1 [1]		2
I.H. 5306	Sampling and Evaluation of Health Hazard Lab [1]		1
I.H. 5426	Principles of Epidemiology		3
I.H. 5606	~~Safety Core~~ Systems Safety and Process Safety Mgt [1]		3
I.H. 5686	~~Advanced~~ Ergonomics for Industrial Hygienists		~~2~~ 3
I.H. 5946	I.H. Graduate Seminar I		1
I.H. 5996	Thesis Research		6
TC 5160	Graduate Writing Seminar		1
ENGR 5940	Engineering Seminar (prerequisite IH 5946)		1
	Total Core Credits for MS IH On-Campus		~~34~~ 35

[1] Graduate students with a B.S. Degree in OSH from Montana Tech have taken these courses but will be required to complete 9 elective credits to replace the 9 core credits. These students also have an adequate background in safety and will be required to complete an additional 3 credit elective.

POTENTIAL ELECTIVE COURSES (at least ~~3~~ 2 credits)

OSH 406	Small Particle Technology		2
OSH 407	Small Particle Technology Lab		1
OSH 416	Industrial Ventilation		2
OSH 427	Mining Safety		3
OSH 424	Environmental Health		3
OSH 444	Law & Ethics for OSH		2
I.H. 5156	~~Noise~~ Occupational & Community Noise		3
I.H.. 5476	Strategies for Occupation Exposure Assessment		3
I.H. 5676	Industrial Respiratory Protection		3
I.H. 5626	Radiological Health and Safety		3
I.H. 5976	Special Problems		3
	TOTAL CREDITS - MS DEGREE IN ON-CAMPUS IH PROGRAM		37

UPDATED 3/24/21

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date March 26, 2021
Dept. Business & Industry Department **College** Highlands College
Program: Healthcare Informatics Certificate

CRC Representative Linda Granger

Description of Request: This moratorium for the Healthcare Informatics (HCI) certificate has already been approved by the Board of Regents, however, it was never taken through our internal process (CRC and Faculty Senate); therefore, we would like to formalize at this level so that the certificate information can be removed from our catalog and website.

Current Course or Program Information: HCI certificate is to be placed in moratorium.

Number (Assigned By CRC): _____
Proposed Change

The certificate is no longer offered at Highlands College and has been in moratorium at the Board of Regents level for some time.

List of Supporting Documentation attached. Not Applicable.

****Board of Regents Academic Proposal Request Form is attached at end of CRC form.**

List of supporting documentation attached (See Level of Request for Requirements): N/A

Assessment Leading to Request
To remove the information regarding the HCI certificate at the CRC and Faculty Senate level since it has already been approved via the BOR.

Anticipated Impacts to "Other" Programs: None.

Impact on Library: No consultation is required.

Date to take effect: Upon Approval.

APPROVALS

Department Head Approval Linda Granger

Date March 26, 2021

Dean Approval
Date 3-26-2021

Graduate Council Approval
Date _____

CRC Approval
Date _____

Faculty Senate Approval
Date _____

VCAA Approval (see below)
Date _____

Chancellor Approval (see below)
Date _____

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Montana Board of Regents

ACADEMIC PROPOSAL REQUEST FORM

ITEM **183-1501-LI0419** Submission Month or Meeting: **April 2019**

Institution: **Montana Technological University** CIP Code: **51.2706**

Program/Center/Institute Title: **Health Care Informatics (All Degrees: BS, GC, AAS, C)**

Includes (please specify below): Online Offering ____ Options

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

X **A. Level I:**

Campus Approvals

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

X

1b. Withdrawing a postsecondary educational program from moratorium

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

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

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

OCHE Approvals

5. Re-titling an existing postsecondary educational program

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

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

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

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

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

Montana Board of Regents

ACADEMIC PROPOSAL REQUEST FORM

____ **B. Level II:**

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

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

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

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

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

Proposal Summary [360 words maximum]

What – Notification of placing the Bachelor of Science in Health Care Informatics, Associate of Applied Health Care Informatics Degree Programs in moratorium.

Why – The decision to place the HCI degrees into moratorium was one of the recommendations that resulted from Montana Tech's campus-wide Program Prioritization effort.

Resources – N/A

Relationship to similar MUS programs – N/A

Curriculum Change Request Form Dated Jan 24, 2021 ME CURRICULUM CHANGES

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval. **Directions found at the end of the document and can be delated before forwarding to the CRC. Complete sections**

Please indicate the type of request(s) by selecting *all that apply*:

- ☒ *Faculty Approvals (directly to CRC, then Faculty Senate):*
- ☐ ***Campus Approvals Level I** (must be approved by the VCAA prior to CRC submission):*
- ☐ ***OCHE Approvals Level I** (must be approved by the VCAA and Chancellor prior to CRC submission)*:
- ☐ ***OCHE Approvals Level II*** Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

1. Date: Feb 1st, 2021
2. Department: Mechanical Engineering
3. College: SME
4. Program: Mechanical Engineering
5. CRC Rep: Peter Lucon

6. Description of Request: Curriculum changes based on ABET evaluations, feedback from industrial advisory board (IAB), and program goals.
7. Current Course or Program Information: Attached, but updated a few courses, but moved around the curriculum based on ABET, IAB, and program goals.
8. Proposed Change As appearing in the catalogue. A new course requires the course outcomes listed in this area.
Course #Name: EMEC 320 Thermodyamics I and EMEC 341: Advanced Mechanics of Materials Credits: 3
Pre-req: attached sheets
Description: MSU teaches these classes. We offered EMEC 320 as EMEC 491 Energy systems for two semesters now and it is working well. EMEC 341 has been offered as EMEC 455. We will replace EMEC 455 with the course content we were covering in EMEC 491 Machine Design.
Course Outcomes: (if required)
9. Assessment Leading to Request:
10. List of supporting documentation attached: See *Level of Request* for requirements.
11. Impacts:

- ☒ No impact to Library or
- ☐ _____consulted with _____from the library to ensure needed materials and media are available
- ☐ No anticipated impact to other programs or
- ☐ _____consulted with _____from _____and

APPROVALS	Date and Signature
Department Head	2-24-21
Dean Approval	3-1-21
Graduate Council	
CRC	
Faculty Senate	

Campus Approvals Level I *(must be approved by the VCAA prior to CRC submission):*
OCHE Approvals Level I & II *(must be approved by the VCAA and Chancellor prior to CRC submission)*

VCAA Approval	
Chancellor Approval	

Curriculum Change Request Form Dated Jan 24, 2021

Guidance: Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)

Level of Request Requirements

Please indicate the type of request(s) by selecting *all that apply*:

1. ***Faculty Approvals*** *(directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)

   or
   - ☑ X-Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Course Number
     - ☑ Course Description
     - ☑ Syllabus with Course Outcomes
     - ☑ Pre-requisites or co-requisites
   - ☑ X-Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor.
     - ☑ **Documents as listed under establishing a new course**
     - ☑ Existing Curriculum Worksheet
     - ☑ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):
2. ***Campus Approvals Level I*** *(must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium.
     - ☐ Academic Proposal Request Form
   - ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more.

   or
   - ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
     - ☐ Academic Proposal Request Form
     - ☐ **Documents as listed under establishing a new course**
   - ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
     - ☐ Academic Proposal Request Form
   - ☐ Other (for those that are considered in this level but otherwise not listed):
     - ☐ Academic Proposal Request Form
3. ***OCHE Approvals Level I*** *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link: https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs

  or
- ☐ Establishing a new minor where there is a major or an option in a major

or

- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
- ☐ Other (for those that are considered in this level but otherwise not listed):

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program
  or
- ☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form
  - ☐ Documents as listed under establishing a new course
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course**
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum or Center/Institute Proposal
  - ☐ Completed Request to Plan, except when eliminating or consolidating
  - ☐ **Documents as listed under establishing a new course**
- ☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ■ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ■ Course Number
     - ■ Course Outcomes
     - ■ Course Description
     - ■ Syllabus
     - ■ Curriculum Worksheet
     - ■ Pre-requisite or co-requisite
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ■ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ■ **Documents as listed under establishing a new course (as applicable)**
     - ■ Existing Curriculum Worksheet
     - ■ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program

- ☐ Request to Plan (RTP)
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program

- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11

- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit

- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date Feb 1. 2021
Dept. Mechanical Engineering **College** School of Mines and Engineering
Program Mechanical Engineering **CRC Representative** Peter Lucon

Description of Request:

Curriculum changes based on ABET evaluations, feedback from industrial advisory board (IAB), and program goals.

Current Course or Program Information:

Attached.

Number (Assigned By CRC):
Proposed Change

Course #	Name	Credits	Pre-req.

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

Attached.

Anticipated Impacts to "Other" Programs

Attached.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): Fall 2021

APPROVALS

Department Head Approval _____
Date 2-24-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date _____

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

[1]Writing Elective is either WRIT 101 or 121 with 121 preferred.
[2]Free Electives are 1XX and higher. COMX 111 (Intro to Public Speaking) recommended. HPER credits are limited to 1 credit.
[3]Programming Elective is either CSCI 112, 117, or 135 with 117 preferred.
[4]Economics Elective is either ECNS 201, 202, or 203 with 203 preferred.
[5]Math Elective is either M 333 (Linear Algebra) or STAT 332 (Statistics) with M 333 preferred.

Note: Upto 3 credits of Internship (EMEC 498) may be used as Professional Electives.

*This course is designated as a Core Class.

#Professional Electives are specifically listed below and include one of the following Focus Areas:

Control Systems: EELE 203, EELE 321, EELE 421, M426
Nanotechnology: EELE 203, CHMY 371, EELE 321, EGEN 474, EMAT 351
Mechanical Design: EMEC 448, EMEC 457, EMEC 322, EMEC 415
Welding: EWLD 314, EWLD 340, EWLD 341, EWLD 443, EWLD 444, EWLD 475, EWLD 476

The following Professional Electives are approved:

CHMY 371	Physical Chemistry - Quantum Chemistry and Spectroscopy
EELE 203	Circuits II for Engineering
EELE 308	Signals and Systems Analysis
EELE 321	Intro to Feedback Control
EELE 421	Feedback Control II
EGEN 474	Introduction to Micro/Nanoelectromechanical Systems
EGEN 492	Aerospace Propulsion
EMAT 351	Fundamentals of Materials
EMEC 322	Product Development
EMEC 415	Impact Dynamics
EMEC 429	Mechanical Component Design Lab
EMEC 435	Rocket Propulsion
EMEC 448	HVAC
EMEC 457	Kinematics
EMEC 490	Undergraduate Reseasrch/Instruction
EMEC 491	Special Topics
EMEC 492	Independent Study
EMEC 498	Internship (Maximum of 3 credits)
ENGR 5710	Advanced Fluids
EWLD 314	Intro to Welding Engineering
EWLD 340	Welding Process Applications
EWLD 341	Welding Process Applications Lab
EWLD 440	Design of Welded Connections
EWLD 443	Physics of Welding
EWLD 444	Physics of Welding Lab
EWLD 475	Robotics and Automated Welding
EWLD 476	Nondestructive Examination

3 credits maximum allowed from the following Project Management courses:

MIN 458	Mine Management
MPEM 5020	Project and Engineering Management

3 credits maximum allowed from the following math/statistics classes:

M 405	Advanced Engineering Mathematics I
M 410	Numerical Computing for Engineering and Science
M 426	Mathematical Modeling
M 435	Advanced Calculus I
STAT 421	Probability Theory
STAT 432	Regression and Model Building

CURRICULUM WORKSHEET

Mechanical Engineering — Name:
Fall 2021 Proposed — Advisor: — Date:

Semester	Course #	Course Title	Semester	Grade	Credits	Math/Sci	Eng Sci	Design	HSS	Other	Total
Freshman	CHMY 141	College Chemistry I			3	3					
First	CHMY 142	College Chemistry Lab I			1	1					
Semester	EGEN 101	Intr Eng Calc & Probs			3		3	D			
	EGEN 194	Intr Eng Seminar			1		1				
	M 171	Calc I			3	3					
	WRIT 1XX	[1]Writing Elective			3					3	
		Humanities Elective			3				3		17
Freshman	CHMY 143	College Chem II			3	3					
Second	CHMY 144	College Chem Lab II			1	1					
Semester	EMEC 215	Intro to Mech CAD Modeling			1		1	D			
	M 172	Calc II			3	3					
	PHSX 234	Gen Phys-Mechanics			3	3					
	CSCI 1XX	[3]Programming Elective			3					3	
		Humanities Elective			3				3		17
Sophomore	EGEN 201	Engr Mechanics-Statics			3		3				
First	EGEN 213	Survey of Met & Mat Eng			3		3				
Semester	M 273	Multivariable Calc			4	4					
	PHSX 235	Gen Phys-Heat, Sound & Optics			3	3					
	PHSX 236	Gen Phys-Heat, Sound & Optics Lab			1	1					
	EELE 201	Circuits I for Engineering			3		3				
	EELE 202	Circuits I for Engineering Lab			1		1				18
Sophomore		[2]Free Elective			4					4	
Second	EGEN 202	Dynamics			3		3				
Semester	EGEN 305	Mech of Materials			3		3				
	EGEN 306	Mech of Materials Lab			1		1				
	M 274	Introduction to Diff Equations			3	3					
	PHSX 237	Gen Phys-Ele, Magn & Motion			3	3					
	PHSX 238	Gen Phys-Ele, Magn & Motion Lab			1	1					18
Junior	EMEC 320	Thermodynamics			3		3				
First	EMEC 341	*Adv. Mechanics of Materials			3		3	D			
Semester	EGEN 318	Comp Apps for Engineering Design			2		2	D			
	EGEN 335	Fluid Mechanics			3		3				
	EGEN 336	Fluid Mechanics Lab			1		1				
		[5]Math Elective			3	3					
		#Professional Electives, 300 or higher			3		3				18
Junior	EGEN 434	*Applied Thermodynamics II			3		3	D			
Second	WRIT 321	Advanced Technical Writing			3					3	
Semester	EELE 320	Process Instr & Control & Lab			4		4	D			
	EMEC 455	*Mech Component Design			3		3	D			
		#Professional Electives, 300 or higher			3		3				16
Senior	EGEN 325	Engineering Economic Analysis			3		3				
First	EGEN 489	Engineering Design I			2		2	D			
Semester	EMEC 326	*Fundamentals of Heat Transfer			3		3	D			
	EMEC 445	Mechanical Vibrations			3		3	D			
		#Professional Electives, 300 or higher			5		5				16
Senior	ECNS 2XX	[4]Economics Elective			3				3		
Second	EELE 355	Electric Machine Fundamentals			3		3				
Semester	EGEN 488	Fundamentals of Engineering Exam			1		1				
	EGEN 499W	Engineering Design II			2		2	D			
	EMEC 402	Mech Engineering Lab			1		1				
		#Professional Electives, 300 or higher			3		3				
		Social Science Elective			3				3		16
					136	35	76		12	13	136

CURRICULUM WORKSHEET

Mechanical Engineering
Fall 2021 Draft

Name:
Advisor: Date:

	Course #	Course Title	Semester	Grade	Credits	Math/Sci	Eng Sci	Design	HSS	Other	Total	Prerequeites		Corequisites
Freshman	CHMY 141	College Chemistry I			3	3						M 151		
First	CHMY 142	College Chemistry Lab I			1	1						CHMY 141 or 121		CHMY 141 or 121
Semester	EGEN 101	Intr Eng Calc & Probs			3		3	D				M 151		
	EGEN 194	Intr Eng Seminar			1		1					M 151		EGEN 101
	M 171	Calc I			3	3						M 151 or equivalent		
	WRIT 1XX	[1]Writing Elective			3					3		WRIT 100	placement	
		Humanities Elective			3				3		17			
Freshman	CHMY 143	College Chem II			3	3						CHMY 141		
Second	CHMY 144	College Chem Lab II			1	1						CHMY 143		CHMY 143
Semester	EMEC 215	Intro to Mech CAD Modeling			1		1	D						
	M 172	Calc II			3	3						M 171		
	PHSX 234	Gen Phys-Mechanics			3	3						M 171		M 172
		~~[2]Free Elective~~	~~Changed to Tech~~		~~3~~					~~3~~				
	CSCI 1XX	[2]Programming Elective			3					3		M 151		M 151
		Humanities Elective			3				3		17			
Sophomore	~~CSCI 1XX~~	~~[2]Programming Elective~~	~~Fr_Spring~~		~~3~~					~~3~~				
First	EGEN 201	Engr Mechanics-Statics			3		3					PHSX 234		
Semester	EGEN 213	Survey of Met & Mat Eng			3		3					CHMY 143		
	M 273	Multivariable Calc			4	4						M 172		
	PHSX 235	Gen Phys-Heat, Sound & Optics			3	3						M 172	PHSX 234	M 273
	PHSX 236	Gen Phys-Heat, Sound & Optics Lab			1	1						PHSX 234		PHSX 235
	EELE 201	Circuits I for Engineering	Moved		3		3							M172
	EELE 202	Circuits I for Engineering Lab	Moved		1		1				18			EELE 201
Sophomore	~~EELE 201~~	~~Circuits I for Engineering~~	~~So_Fall~~		~~3~~		~~3~~							
Second	~~EELE 202~~	~~Circuits I for Engineering Lab~~	~~So_Fall~~		~~1~~		~~1~~							
Semester		Free Electives	NEW		4									
	EGEN 202	Dynamics			3		3					EGEN 201	M 172	
	~~EGEN 324~~	~~Applied Thermodynamics~~	~~Removed~~		~~3~~		~~3~~							
	EGEN 305	Mech of Materials	Moved		3		3					EGEN 201	M 172	
	EGEN 306	Mech of Materials Lab	Moved		1		1							EGEN 305
	M 274	Introduction to Diff Equations			3	3						M 273		
	PHSX 237	Gen Phys-Ele, Magn & Motion			3	3						M 273	PHSX 234 PHSX 235	M 274
	PHSX 238	Gen Phys-Ele, Magn & Motion Lab			1	1					18	PHSX 235		PHSX 237
Junior	~~ECNS 2XX~~	~~[4]Economics Elective~~	~~Sr_Sp~~		~~3~~				~~3~~					
First	~~EELE 320~~	~~Process Instr & Control~~	~~Jr_Sp~~		~~3~~		~~3~~	~~D~~						
Semester	~~EELE 320~~	~~Process Instr & Control Lab~~	~~Jr_Sp~~		~~1~~		~~1~~							
	EMEC 320	Thermodynamics	NEW		3		3					PHSX 235		
	~~EGEN 305~~	~~Mech of Materials~~	~~So_Sp~~		~~3~~	-	~~3~~							
	~~EGEN 434~~	~~*Applied Thermodynamics II~~	~~Jr_Sp~~		~~3~~		~~3~~	~~D~~						
	EMEC 341	*Adv. Mechanics of Materials	NEW		3		3	D				EGEN 305		
	~~WRIT 321~~	~~Advanced Technical Writing~~	~~Jr_Sp~~		~~3~~					~~3~~				
	EGEN 318	Comp Apps for Engineering Design	Moved		2		2	D				EMEC 215	EGEN 305	EGEN 305
		[3]Professional Electives, 300 or higher	Moved		3		3	D						
	EGEN 335	Fluid Mechanics	Moved		3		3					EGEN 201	M 172	
	EGEN 336	Fluid Mechanics Lab	Moved		1		1					EGEN 335		EGEN 335
		[5]Math Elective	Moved		3	3								
		~~[2]Free Elective~~	~~Changed to Tech~~		~~1~~					~~1~~	18			
Junior	~~EGEN 306~~	~~Mech of Materials Lab~~	~~So_Sp~~		~~1~~		~~1~~							
Second	~~EGEN 318~~	~~Comp Apps for Engineering Design~~	~~Jr_Fall~~		~~2~~		~~2~~	~~D~~						

Semester	~~EGEN 325~~	~~Engineering Economic Analysis~~	~~Sr_Fall~~		~~3~~		~~3~~						
	EGEN 434	*Applied Thermodynamics II	NEW		3		3	D				EMEC 320	
	~~EGEN 335~~	~~Fluid Mechanics~~	~~Jr_Fall~~		~~3~~		~~3~~						
	~~EMEC 326~~	~~*Fundamentals of Heat Transfer~~	~~Sr_Fall~~		~~3~~		~~3~~	~~D~~					
	WRIT 321	Advanced Technical Writing	Moved		3					3		WRIT 101 or 121	Jr. Standing
	EELE 320	Process Instr & Control & Lab	Moved		4		4	D				EELE 201 & 202	
	EMEC 455	*Mech Component Design	Moved		3		3	D				EMEC 341	
		~~[5]Math Elective~~	~~Jr_Fall~~		~~3~~	~~3~~							
		#Professional Electives, 300 or higher			**3**		**3**	**D**			16		
Senior	~~EGEN 488~~	~~Fundamentals of Engineering Exam~~	~~Sr_Sp~~		~~1~~		~~1~~						
First	**EGEN 489**	**Engineering Design I**			**2**		**2**	**D**				~~EGEN 318~~	**anding or C** EMEC 322
Semester	**EMEC 445**	**Mechanical Vibrations**			**3**		**3**	**D**				**EGEN 202**	
	~~EMEC 455~~	~~*Mech Component Design~~	~~Jr_Fall_NC~~		~~3~~		~~3~~	~~D~~					
	EGEN 325	Engineering Economic Analysis	Moved		3		3					**Jr. Standing**	
	EMEC 326	*Fundamentals of Heat Transfer	Moved		3		3	D				**EGEN 324**	**r** EMEC 320
		#Professional Electives, 300 or higher			**3**		**3**	**D**					
		#Professional Electives, 300 or higher			2		2	D					
		~~Social Science Elective~~	~~Jr_Sp~~		~~3~~				~~3~~		16		
Senior	**EELE 355**	**Electric Machine Fundamentals**			**3**		**3**					**EELE 201 & 202**	
Second	~~EGEN 336~~	~~Fluid Mechanics Lab~~	~~Jr_Fall~~		~~1~~		~~1~~						
Semester	EGEN 499	Engineering Design II			2		2	D				**EGEN 489W**	
	EMEC 402	**Mech Engineering Lab**			**1**		**1**					EGEN 324	EGEN 434EC 326 & 455
	ECNS 2XX	[4]Economics Elective	Moved		3				3				
	EGEN 488	Fundamentals of Engineering Exam	Moved		1		1					**Graduating Seniors**	
		Social Science Elective	Moved		3				3				
		#Professional Electives, 300 or higher			**3**		**3**	**D**					
		~~[2]Professional Electives, 300 or higher~~	~~Remove~~		~~3~~		~~3~~	~~D~~					
		~~[2]Professional Electives, 300 or higher~~	~~Jr_Fall~~		~~3~~		~~3~~	~~D~~			16		
						38	**116**		**18**	**19**	**136**		

[1]Writing Elective is either WRIT 101 or 121 with 121 preferred.

[2]Free Electives are 1XX and higher. COMX 111 (Intro to Public Speaking) recommended. HPER credits are limited to 1 credit.

[3]Programming Elective is either CSCI 112, 117, or 135 with 117 preferred.

[4]Economics Elective is either ECNS 201, 202, or 203 with 203 preferred.

[5]Math Elective is either M 333 (Linear Algebra) or STAT 332 (Statistics) with M 333 preferred.

~~Note- Internship credits are limited to 3 credits.~~

*This course is designated as a Core Class.

#Professional Electives are specifically listed below and include one of the following Focus Areas:

Control Systems: EELE 203, EELE 321, EELE 421, M426
Nanotechnology: EELE 203, CHMY 371, EELE 321, EGEN 474, EMAT 351
Mechanical Design: EMEC 448, EMEC 457, EMEC 322, EMEC 415, ~~EMEC 455~~
Welding: EWLD 314, EWLD 340, EWLD 341, EWLD 443, EWLD 444, EWLD 475, EWLD 476

The following Professional Electives are approved:

CHMY 371 Physical Chemistry - Quantum Chemistry and Spectroscopy
EELE 203 Circuits II for Engineering
EELE 308 Signals and Systems Analysis

EELE 321	Intro to Feedback Control
EELE 421	Feedback Control II
EGEN 474	Introduction to Micro/Nanoelectromechanical Systems
EGEN 492	Aerospace Propulsion
~~EGEN 498~~	~~Internship~~
EMAT 351	Fundamentals of Materials
EMEC 322	Product Development
EMEC 415	Impact Dynamics
EMEC 429	Mechanical Component Design Lab
EMEC 435	Rocket Propulsion
EMEC 448	HVAC
EMEC 457	Kinematics
EMEC 490	Undergraduate Reseasrch/Instruction
EMEC 491	Special Topics
EMEC 492	Independent Study
EMEC 498	Internship
~~EMEC 455~~	~~Machine Design II~~
ENGR 5710	Advanced Fluids
~~ENGR 5850~~	~~Advanced Mechanics of Materials~~
EWLD 314	Intro to Welding Engineering
EWLD 340	Welding Process Applications
EWLD 341	Welding Process Applications Lab
EWLD 440	Design of Welded Connections
EWLD 443	Physics of Welding
EWLD 444	Physics of Welding Lab
EWLD 475	Robotics and Automated Welding
EWLD 476	Nondestructive Examination

3 credits maximum allowed from the following Project Management courses:

MIN 458	Mine Management
MPEM 5020	Project and Engineering Management

3 credits maximum allowed from the following math/statistics classes:

M 405	Advanced Engineering Mathematics I
M 410	Numerical Computing for Engineering and Science
M 426	Mathematical Modeling
M 435	Advanced Calculus I
STAT 421	Probability Theory
STAT 432	Regression and Model Building

MECHANICAL ENGINEERING
RECOMMENDED CURRICULUM
REV. 2021 R07 DRAFT

MONTANA TECHNOLOGICAL UNIVERSITY

FRESHMAN YEAR

FIRST SEMESTER — 17 Credits

- WRIT 121 — TECH WRITING — CREDITS: 3
- XXXX XXX — HUMANITIES ELECTIVE — CREDITS: 3
- CHMY 141 — COLLEGE CHEMISTRY — CREDITS: 3
- CHMY 142 — COLLEGE CHEMISTRY LAB — CREDITS: 1
- EGEN 101 — INTR ENG CALC & PROBS — CREDITS: 3
- EGEN 194 — INTR ENG SEMINAR — CREDITS: 1
- M 171 — CALCULUS I — CREDITS: 3

SECOND SEMESTER — 17 Credits

- CSCI 117 — PROGRAMMING WITH MATLAB — CREDITS: 3
- XXXX XXX — HUMANITIES ELECTIVE — CREDITS: 3
- CHMY 143 — COLLEGE CHEMISTRY II — CREDITS: 3
- CHMY 144 — COLLEGE CHEMISTRY LAB II — CREDITS: 1
- EMEC 215 — INTRO TO MECH CAD MODELING — CREDITS: 1
- PHSX 234 — GEN PHYS: MECHANICS — CREDITS: 3
- M 172 — CALCULUS II — CREDITS: 3

SOPHOMORE YEAR

FIRST SEMESTER — 18 Credits

- EGEN 213 — SURVEY OF MET & MAT ENG — CREDITS: 3
- M 273 — MULTIVARIABLE CALC — CREDITS: 4
- PHSX 236 — GEN PHYS LAB: HEAT, SOUND, & OPTICS — CREDITS: 1
- PHSX 235 — GEN PHYS: HEAT, SOUND, & OPTICS — CREDITS: 3
- EGEN 201 — ENGR MECHANICS - STATICS — CREDITS: 3
- EELE 202 — CIRCUITS I LAB — CREDITS: 1
- EELE 201 — CIRCUITS I — CREDITS: 3

SECOND SEMESTER — 18 Credits

- XXXX XXX — FREE ELECTIVES — CREDITS: 4
- M 274 — INTR TO DIFF EQUATIONS — CREDITS: 3
- PHSX 237 — GEN PHYS: ELE, MAG & MOTION — CREDITS: 3
- PHSX 238 — GEN PHYS LAB: ELE, MAG & MOTION — CREDITS: 1
- EGEN 202 — ENGR MECHANICS - DYNAMICS — CREDITS: 3
- EGEN 305 — MECHANICS OF MATERIALS — CREDITS: 3
- EGEN 306 — MECHANICS OF MATERIALS LAB — CREDITS: 1

JUNIOR YEAR

FIRST SEMESTER — 18 Credits

- 3XX OR HIGHER — PROFESSIONAL ELECTIVE — CREDITS: 3
- EMEC 320 — THERMODYNAMICS I — CREDITS: 3
- EGEN 318 — COMPUTER APPS FOR ENGINEERING DESIGN — CREDITS: 2
- EMEC 341 — ADV MECHANICS OF MATERIALS — CREDITS: 3
- M 333 — MATH ELECTIVE — CREDITS: 3
- EGEN 335 — FLUID MECHANICS — CREDITS: 3
- EGEN 336 — FLUID MECHANICS LAB — CREDITS: 1

SECOND SEMESTER — 16 Credits

- WRIT 321 — ADVANCED TECH WRITING — CREDITS: 3
- 3XX OR HIGHER — PROFESSIONAL ELECTIVE — CREDITS: 3
- EGEN 434 — THERMODYNAMICS II — CREDITS: 3
- 3XX OR HIGHER — PROFESSIONAL ELECTIVE — CREDITS: 3
- EMEC 455 — MECH COMPONENT DESIGN — CREDITS: 3
- EELE 320 — PROCESS INSTRUMENTATION AND CONTROL LAB — CREDITS: 1
- EELE 320 — PROCESS INSTRUMENTATION AND CONTROL — CREDITS: 3

SENIOR YEAR

FIRST SEMESTER — 16 Credits

- 3XX OR HIGHER — PROFESSIONAL ELECTIVE — CREDITS: 2
- 3XX OR HIGHER — PROFESSIONAL ELECTIVE — CREDITS: 3
- EMEC 326 — FUNDAMENTALS OF HEAT TRANSFER — CREDITS: 3
- EGEN 325 — ENGINEERING ECONOMIC ANALYSIS — CREDITS: 3
- 3XX OR HIGHER — PROFESSIONAL ELECTIVE — CREDITS: 3
- EGEN 489 — ENGINEERING DESIGN I — CREDITS: 2
- EMEC 445 — MECHANICAL VIBRATIONS — CREDITS: 3
- EGEN 488 — FUNDAMENTALS OF ENGINEERING EXAM — CREDITS: 1
- EELE 355 — ELECTRIC MACHINE FUNDAMENTALS — CREDITS: 3

SECOND SEMESTER — 16 Credits

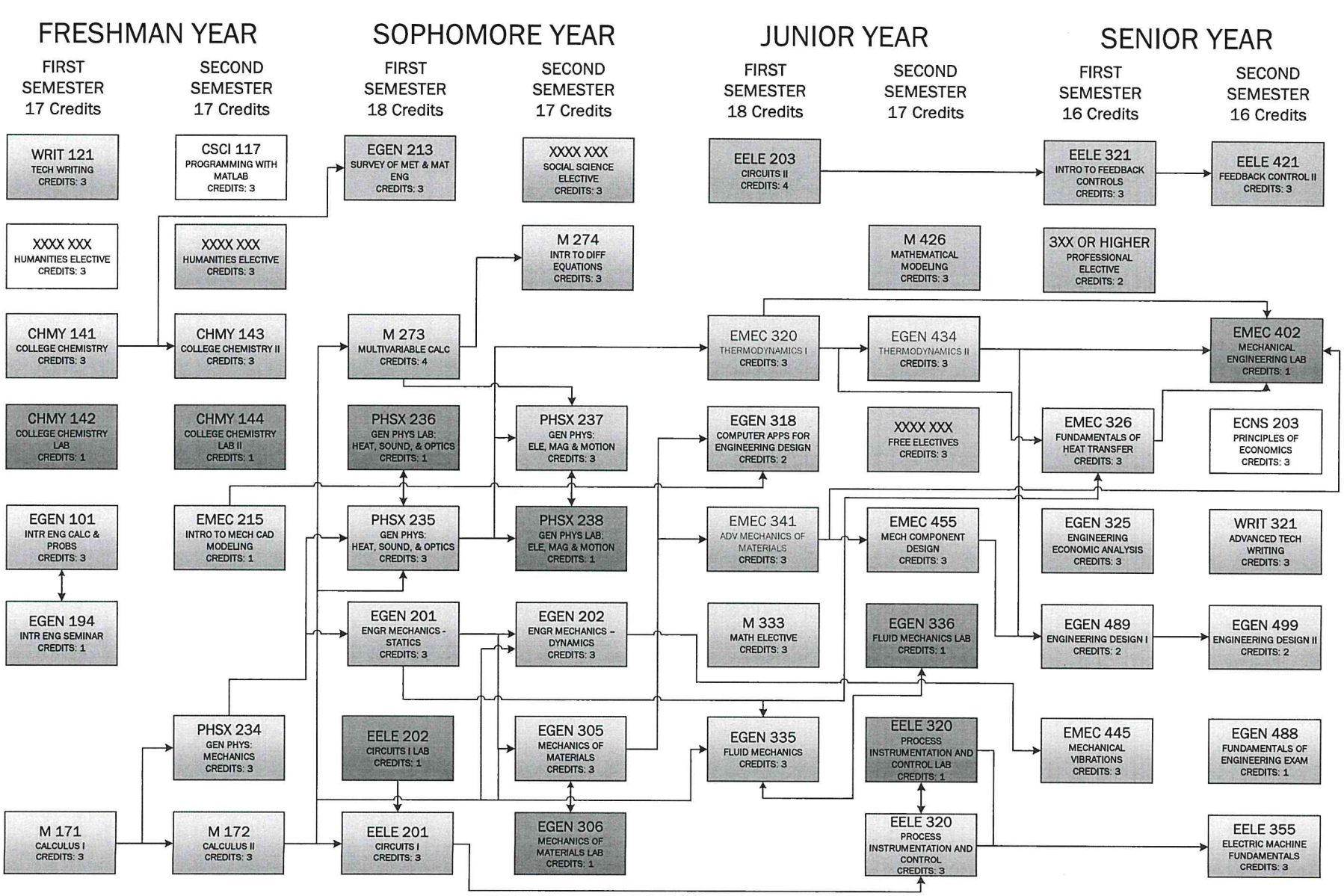
- EMEC 402 — MECHANICAL ENGINEERING LAB — CREDITS: 1
- XXXX XXX — SOCIAL SCIENCE ELECTIVE — CREDITS: 3
- ECNS 203 — PRINCIPLES OF ECONOMICS — CREDITS: 3
- EGEN 499 — ENGINEERING DESIGN II — CREDITS: 2

MECHANICAL ENGINEERING
MACHINE DESIGN FOCUS AREA
RECOMMENDED CURRICULUM
REV. 2021 R07 DRAFT

MONTANA
TECHNOLOGICAL UNIVERSITY

MONTANA TECHNOLOGICAL UNIVERSITY

MECHANICAL ENGINEERING CONTROL SYSTEM FOCUS AREA RECOMMENDED CURRICULUM REV. 2021 R07 DRAFT

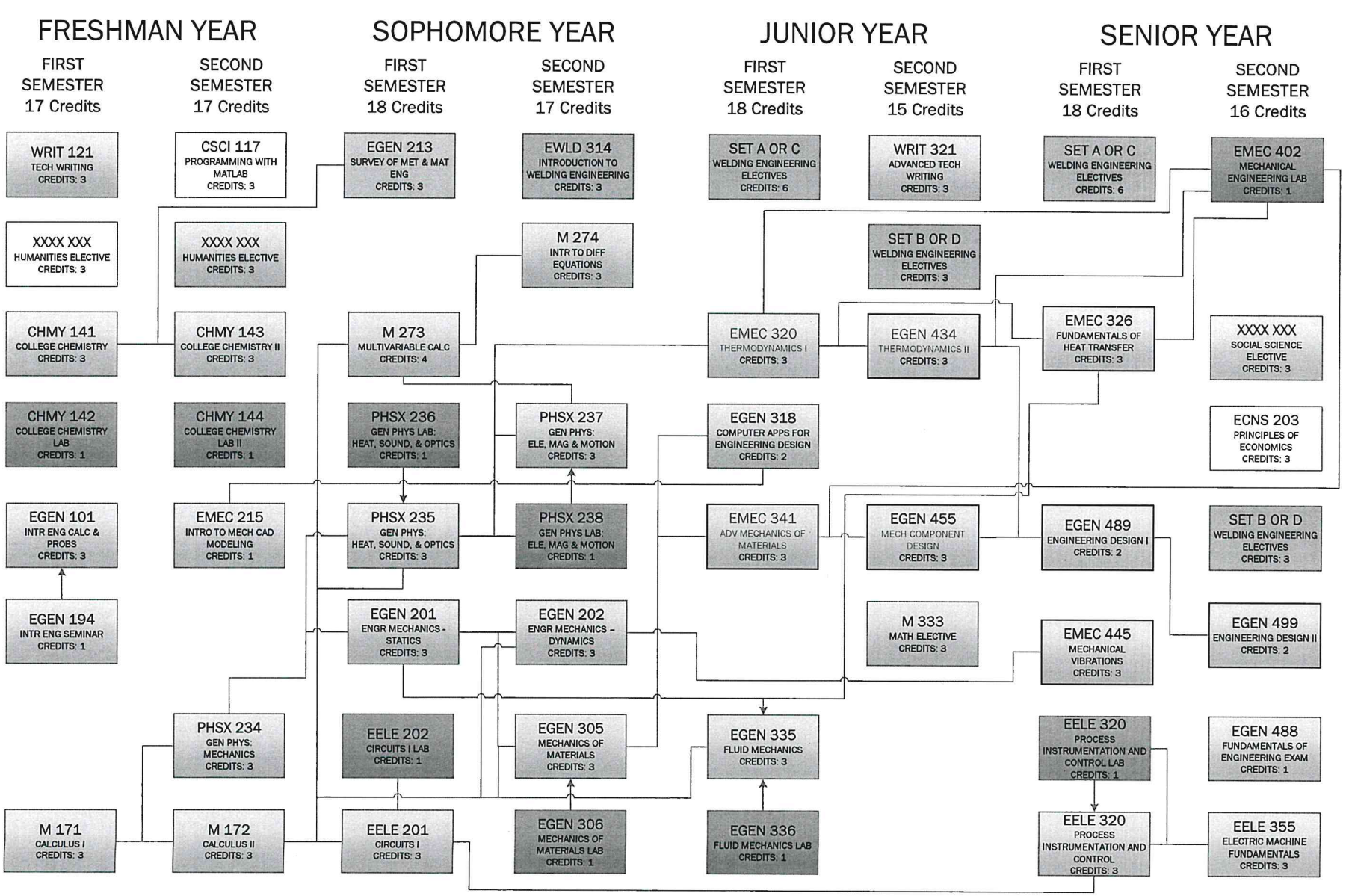


MECHANICAL ENGINEERING
NANOTECHNOLOGY FOCUS AREA
RECOMMENDED CURRICULUM
REV. 2021 R07 DRAFT

MONTANA TECHNOLOGICAL UNIVERSITY

MONTANA TECHNOLOGICAL UNIVERSITY

MECHANICAL ENGINEERING
WELDING FOCUS AREA
RECOMMENDED CURRICULUM
REV. 2021 R07 DRAFT



Set A, Taken Odd Fall Semesters, 6 credits
EMAT 351, Fundamentals of Materials, 3 lecture credits
EMAT 353, Microstructural Interpretation, 1 lab credit
EWLD 440, Design of Welded Connections, 2 lecture credits

Set B, Taken Even Spring Semesters, 3 credits
EWLD 488, Metallurgy of Welds, 3 lecture credits

Set C, Taken Even Fall Semesters, 6 credits
EWLD 340, Welding Process Applications, 2 lecture credits
EWLD 341, Welding Process Applications Lab, 1 lab credit
EGEN 325, Engineering Economic Analysis, 3 lecture credits

Set D, Taken Odd Spring Semesters, 3 credits
EWLD 476, Nondestructive Evaluation

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ■ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ■ Course Number
     - ■ Course Outcomes
     - ■ Course Description
     - ■ Syllabus
     - ☐ Curriculum Worksheet
     - ■ Pre-requisite or co-requisite
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program

- ☐ Request to Plan (RTP)
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program

- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11

- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit

- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date Feb 1. 2021
Dept. Mechanical Engineering
College School of Mines and Engineering
Program Mechanical Engineering
CRC Representative Peter Lucon

Description of Request:

Updated course based on FE results and IAB feedback to spend more time teaching the fundamentals for Thermodynamics. Split into two semesters

Current Course or Program Information:

Attached.

Number (Assigned By CRC):

Proposed Change

Course #	Name	Credits	Pre-req.
EMEC 320	Thermodynamics I	3 credits	PHSX 235

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

Cleaning up curriculum to match MUS CCN and teaching a ME specific Thermodynamics.

Anticipated Impacts to "Other" Programs

None.

Impact on Library: None Anticipated. has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): Fall 2021

MontanaTech

Curriculum Change Request Form Dated August 15, 2020

APPROVALS

Department Head Approval _____
Date 2-24-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date _____

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

Montana Technological University

School of Mines and Engineering

EMEC 320 – Thermodynamics I

Spring 2021

Natural Resource Building, Room No.122

MWF 10:00AM – 10:50AM

Instructor: Dario Prieto
406-496-4186
dprieto@mtech.edu
Science & Engineering Building, Room 314
Office hours: Thursday, TBA

Department: Mechanical Engineering Department

Designation: Mechanical Engineering Program

Course (Catalog) Description: The study of energy and its transformation, the processes involved and properties of the substances employed. Topics include the first and second laws of thermodynamics, enthalpy, entropy, available energy, ideal and real gases, the phases of pure substances.

Prerequisites: PHSX 235 - General Physics-Heat, Sound & Optics & M 273 Multivariable Calculus

Textbook: Thermodynamics: an engineering approach. Yunus A Çengel; Michael A Boles. McGraw-Hill Education [2015].

Course Goal: For students to understand the fundamentals of energy in its various forms and the associated interconversions.

Course Outcomes: This course will give students the tools to:

1. Determine all properties of a working fluid at any given state;
2. Analyze the performance of power and refrigeration cycles using the laws of thermodynamics and principles of closed and open systems;

Contribution to Professional Component: Engineering topics – 3 credits

In case we move to a remote learning format, this class will change as follows:

1. Short lectures covering new material will be posted on Moodle
2. Office hours will be exclusively via Microsoft Teams at the schedule times
3. Exams will be 2 h take-home assignments that will open at 10AM on the schedule days

COVID-19 Safety Policy

We know from existing data that wearing an appropriate face covering (see below) in public can help prevent the spread of COVID-19 in the community (Lyu & Wehby, 2020; CDC, 2020; Johns Hopkins Medicine, 2020). In accordance with policy from the Montana University System, Montana Technological University has determined that everyone will be required to wear a face covering in university buildings, including classrooms. *You MUST wear a face covering appropriately* (i.e., covering both your mouth and nose) in the building when you are attending class in person. Face coverings have been provided for students, instructors, and staff, and everyone is expected to wear one while inside any university building.

Anyone attending class in person without a face covering will be asked to put one on or leave. Instructors will have the option to end class if anyone present refuses to appropriately wear a face covering for the duration of class. Students who refuse to wear face coverings appropriately or adhere to other stated requirements may face disciplinary action for Code of Conduct violations. On a case-by-case basis, students may consult with the Dean of Students and/or Student Disability Resources.

Appropriate Face Coverings

Appropriate face coverings are those that cover the mouth and nose of the wearer. Following CDC guidance, effective face coverings include simple cloth masks, scarves, buffs, or bandanas. Based on CDC guidance, the most effective face coverings should:

- fit snugly but comfortably against the side of the face;
- securely stay in place, covering the nose and mouth;
- include multiple layers of fabric;
- allow for breathing without restriction; and
- be able to be laundered and machine-dried without damaging them or changing their shape.

While not ideal, disposable, single use paper masks are also acceptable when another face covering option is not available. Unless in healthcare or other specialized settings, N95 or surgical masks should not be used as they are critical supplies and should be reserved for healthcare workers and other first responders.

While plastic face shields are not considered a face covering under the guidelines outlined above, face shields may be used in instances where an individual can consistently and reliably maintain appropriate social distancing and where the University has expressly approved the use of the face shield instead of a cloth mask. Such instances may include, but not be limited to, ADA and other medical accommodations. If an individual is approved to use a plastic face shield, the shield should cover from above the eyes to below the chin to reduce the risk of the spread of respiratory particles.

References

- Centers for Disease Control and Prevention. (2020, April 3) Recommendation Regarding the Use of Cloth Face Coverings, Especially in Areas of Significant Community-Based Transmission.
- Johns Hopkins Medicine. (2020, June 17) Coronavirus Face coverings & Protection FAQs.
- Lyu, W. and Wehby, G.L. (2020, June 16) Community Use Of Face coverings And COVID-19: Evidence From A Natural Experiment Of State Mandates In The US. Health Affairs.

Academic Integrity

Academic dishonesty will not be tolerated. For a detailed description of academic integrity, including definitions of copying and plagiarism, see p. 15-16 of the Montana Tech Student Handbook. If you have questions about actions that violate the academic integrity policy, *ask* before you engage.

During exams, no interaction between students will occur. Exams will be closed-notes and closed-book unless otherwise noted. Students may use a calculator, but not a cell phone, computer, tablet, etc.

If academic dishonesty is suspected, it will be reported to the Office of the Vice Chancellor for Academic Affairs and could potentially result in an "F" for the project/exam or the course or expulsion.

Technology Policy

Computers, cell phones, tablets, etc. will *only* be used to enhance the learning experience in class at times designated by the instructor. Do not check your email, texts, social media, etc. during lecture.

Accommodations

Students requiring reasonable accommodation for a documented disability should contact Joyce O'Neil, Montana Tech North Campus Disability Services Coordinator (x4429). Please inform me of any documented disabilities as soon as possible.

Inclusivity

Students in this course represent a rich variety of backgrounds and perspectives. I am committed to providing an atmosphere for learning that respects diversity, and therefore ask all students to:

a) share their unique experiences, values and beliefs
b) be open to the views of others
c) honor the uniqueness of their colleagues
d) appreciate the opportunity that we have to learn from each other
e) value each other's opinions and communicate respectfully

[adapted from Cornell's CTE]

Evacuation

In case of a fire or other emergency, the class will calmly evacuate to Assembly Area 1 on Park St. north of Leonard Field by the handrail.

Grading Scale:

Grade	-		+
A	90 – 92	93 – 100	
B	80 – 82	83 – 86	87 – 89
C	70 – 72	73 – 76	77 – 79
D	60 – 62	63 – 66	67 – 69
F		< 60	

Assessments:

	Frequency	*Value*
Homework	Weekly	10%
Quizzes	Weekly	30%
Exams	Best 3 out of 4	60%

Readings: Readings will not be assessed directly, but their content is part of the course and will appear in homework assignments and exams. Assigned readings will comprise related material that complements, supplements, or expands content from the lectures. In case the readings are not in the textbook, the instructor will supply copies.

Homework: Problem sets will cover part of a topic, involve material from lectures and readings, and introduce new concepts. They will be due on Fridays at 5:00PM and you must submit them as a PDF via Moodle. You can expect homework sets to be very difficult and take about 3 hours per week. You are encouraged to work in teams, but every participant must turn in their own solutions. In addition, you must show all your work and clearly mark the answer to receive full credit for a problem.

Quizzes: Short questions or problems related to that week's homework will open on Moodle on Friday after class and close at 5PM. You get a single 15-minute attempt to complete the quiz. Questions will involve concept definitions, simple calculations, looking up values in tables, extracting information from diagrams, etc.

Exams: There will be four exams through the semester and the lowest grade will be dropped. The first three exams will cover new material only while the fourth (the final) will be cumulative. Some questions in the exams will test your ability to solve new problems using concepts from the class. One or two class sessions before each exam will be reviews. Exam grades will be curved to a (***B–***) average if the class average is below 80%.

Extra Credit: You can receive up to 4% in extra credit by doing additional reading. Read one book from the list and stop by the instructor's office to discuss it.

- *The alchemy of air*, by Thomas Hager (2008)
- *A brief history of time*, by Stephen Hawkins (1988)

Important dates:

Jan 4	M	1st day of classes
Jan 8	F	HW 1, Q 1
Jan 15	F	HW 2, Q 2
Jan 18	M	No classes – MLK day
Jan 22	F	HW 3, Q 3
Jan 25	M	Last day to drop classes without a W
Jan 29	F	HW 4, Q 4
Feb 1	M	EXAM 1
Feb 12	F	HW 5, Q 5
Feb 15	M	No classes – Presidents Day
Feb 19	F	HW 6, Q 6
Feb 26	F	HW 7, Q 7
Mar 5	F	HW 8, Q 8
Mar 8	M	EXAM 2
Mar 19	F	HW 9, Q 9
Mar 23	T	las day to drop classes with a W
Mar 26	F	HW 10, Q 10
Apr 2	F	HW 11, Q 11
		No classes – Spring Mini Break
Apr 9	F	HW 12, Q 12
Apr 12	M	EXAM 3
Apr 19	M	EXAM 4

Topics Covered: *(Subject to change during the semester.)*

1. System properties
   - Open, closed, and isolated systems
   - Pressure, temperature, and equations of state
   - Property diagrams and tables
   - Equations of state
2. The 1st law of thermodynamics
   - Energy, work, and heat
   - Conservation of mass and energy
   - Internal energy, enthalpy, and specific heats
   - Energy analysis of work-producing and work-consuming devices
   - Energy analysis of heat exchangers and stream mixers
3. The 2nd law of thermodynamics
   - Reversibility and irreversibility
   - The Carnot cycle, ideal vs. real, and efficiency
   - Entropy of systems and pure substances
   - Entropy changes in reversible and irreversible processes
   - Available energy and 2nd law efficiency

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ■ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ■ Course Number
     - ■ Course Outcomes
     - ■ Course Description
     - ■ Syllabus
     - ☐ Curriculum Worksheet
     - ■ Pre-requisite or co-requisite
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ■ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ■ **Documents as listed under establishing a new course (as applicable)**
     - ■ Existing Curriculum Worksheet
     - ■ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program

- ☐ Request to Plan (RTP)
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program

- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11

- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit

- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date Feb 1. 2021
Dept. Mechanical Engineering
College School of Mines and Engineering
Program Mechanical Engineering
CRC Representative Peter Lucon

Description of Request:

Create a new course at Montana Tech, but it will match the current MUS CCN EMEC 341 course.

Current Course or Program Information:

Attached.

Number (Assigned By CRC):

Proposed Change

Course #	Name	Credits	Pre-req.
EMEC 341	Advanced Mechanics of Materials	3 credits	EGEN 305

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

Cleaning up curriculum to match MUS CCN.

Anticipated Impacts to "Other" Programs

None.

Impact on Library: None Anticipated. has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): Fall 2021

APPROVALS

Department Head Approval _____
Date 2-24-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date _____

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

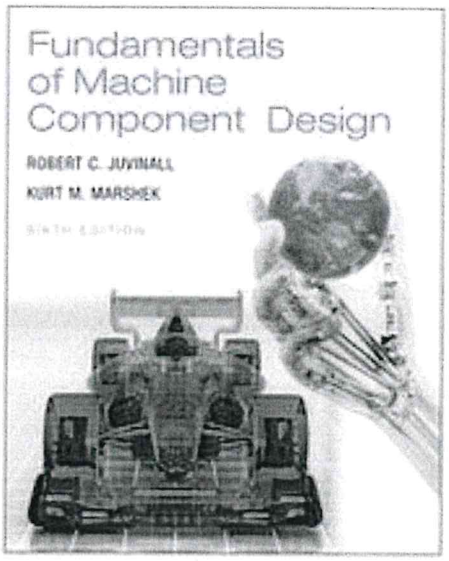
VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

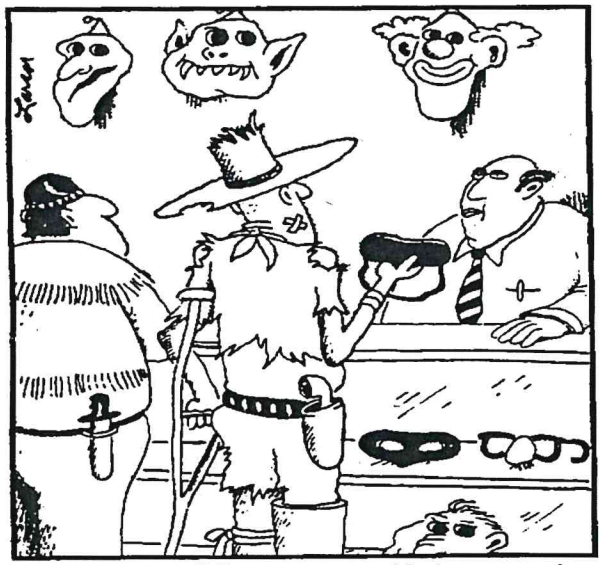
EMEC 341 COURSE SYLLABUS
ADVANCED MECHANICS OF MATERIALS

Instructor: G. Steve Tarrant, M.S., PE
Office hours: SE 310, MW 10-11, T 1-2, or by appointment
406-496-4738
starrant@mtech.edu

TEXT:



ISBN-13: 978-1-118-98768-1



"Say ... weren't there supposed to be a couple of holes punched in this thing?"

OPTIONAL, but helpful: Larson, Gary, *The Complete Far Side*
ISBN-10: 1449460046
ISBN-13: 978-1449460044

COURSE OBJECTIVES: The primary objective of this course is to develop a background in more advanced mechanics of materials to be used in the design of mechanical components. The approach will rely heavily on the student's background in mechanics of materials and material properties. The entire machine design curriculum requires two semesters to complete. This first semester, EMEC 341, will include material properties, fatigue, fracture, corrosion, deflection, impact, energy methods, failure criteria, and basic stress and strain analysis. Some of the principles used for design of specific machine components may be covered. The second semester, EMEC 455 Mechanical Component Design, covers the design of specific machine components such as bearings, gears, clutches, brakes, etc. Both courses use the same textbook.

HOMEWORK: Problems from the text will be assigned for each of the chapters covered. Homework will not be collected or graded. Instead, on the due date for each problem set, a quiz will be given over the material. Quiz problems will be representative of the assigned homework problems, so diligently doing the assigned homework will be critical for success in the course.

TESTS: There will be three regular exams and a final exam during the semester. Each regular exam will count as 20% of your final grade, the final exam will count as 25%, and the quizzes will count as 15%.

GRADING:	90 – 100%	A
	80 – 89%	B
	70 – 79%	C
	60 – 69%	D
	<60%	F

Academic Integrity and Professionalism

When I was in college, we had to hand-write and sign the following statement on every exam we took:

I have neither given nor received aid on this exam. (*Signature*)

I still adhere to this principle, and so does Montana Tech. Any form of dishonesty or cheating will not be tolerated, and an automatic failure will be the result. Please do your own work on tests and quizzes. Group study is a valuable learning technique for homework, where students can discuss the approach and calculations. However, copying someone else's work keeps you from learning, and it is degrading to the student from whom you copied it.

Being an engineer is very similar to being a medical doctor. I would not want to put my health into the hands of a doctor who cheated on exams in medical school, nor would I want to drive over a suspension bridge designed by an engineer who has no integrity, or who cheated on his or her exams. Begin being a professional now, and take responsibility for yourself and your work.

The course is directed toward specific goals and outcomes, identified by the Accreditation Board for Engineering and Technology (ABET). These goals are given below.

ABET Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
    b. Identify, formulate, and solve engineering problems by Applying Principles of Engineering, Science, and Mathematics
8. The knowledge and application of basic science, advanced mathematics including multivariate calculus and differential equations, and principles of engineering; to model, analyze, design and realize physical systems, components, or processes
    d. Have and apply knowledge to design, analyze, and realize physical systems, components or processes
9. The knowledge in either thermal or mechanical systems to work in these areas professionally
    b. Have and apply knowledge of mechanical system

APPROXIMATE SCHEDULE

Aug. 17-21	Introduction and course logistics Design considerations, safety factors Loads analysis/equilibrium, free-body diagrams Work, energy, power Materials Stress and strain
Aug. 24-Aug. 28	Materials Stress and strain Deflection, energy methods, Castigliano's Theorem
Aug. 31-Sept. 4	Castigliano's Theorem Combined stress states, Mohr's circle Static failure criteria
Sept. 7-11	***Monday, Sept. 7, Labor Day holiday*** **EXAM 1 Friday, Sept. 11 – stress/strain, combined stresses, Mohr's circle** Static failure criteria, elastic stability
Sept. 14-18	Fracture mechanics
Sept. 21-25	Fracture mechanics, Impact
Sept. 28-Oct. 2	**EXAM 2 Friday, October 2 – Castigliano's Theorem, failure criteria, impact, fracture** Fatigue
Oct. 5-9	Fatigue
Oct. 12-16	Fatigue
Oct. 19-23	Contact stresses, surface fatigue
Oct. 26-30	Corrosion, wear, fretting
Nov. 2-6	***Tuesday, Nov. 3 – Election Day*** Impact
Nov. 9-13	***Wednesday, Nov. 11 – Veterans' Day holiday*** **EXAM 3 Friday, November 13 – fatigue, contact stresses** Impact
Nov. 16-20	Final Exams start Wednesday, Nov. 18
Nov. 23-27	Final Exams end Tuesday, Nov. 24 ***EMEC 455 Final Exam, Tuesday, Nov. 24, 11:30-1:30***

This syllabus is subject to change at any time during the semester.

For Drop/Add dates and holidays, see https://www.mtech.edu/calendar-schedules/academic-calendar.html

Montana Tech's mask policy, Fall 2020:

We know from existing data that wearing an appropriate face covering* in public can help prevent the spread of COVID-19 in the community (Lyu & Wehby, 2020; CDC, 2020; Johns Hopkins Medicine, 2020). In accordance with policy from the Montana University System, Montana Technological University has determined that everyone will be required to wear a face covering in university buildings, including classrooms. You MUST wear a face covering appropriately (i.e., covering both your mouth and nose) in the building when you are attending class in person. Face coverings have been provided for students, instructors, and staff, and everyone is expected to wear one while inside any university building.

Anyone attending class in person without a face covering will be asked to put one on or leave. Instructors will have the option to end class if anyone present refuses to appropriately wear a face covering for the duration of class. Students who refuse to wear face coverings appropriately or adhere to other stated requirements may face disciplinary action for Code of Conduct violations. On a case-by-case basis, students may consult with the Dean of Students and/or Student Disability Resources.

* As per MUS "Updated MUS Healthy Fall 2020 Planning Guidelines: Face Covering Requirements", and appropriate face covering are defined by the following:

> Appropriate face coverings are those that cover the mouth and nose of the wearer. Following CDC guidance, effective face coverings include simple cloth masks, scarves, buffs, or bandanas.
> Based on CDC guidance, the most effective face coverings should:
>
> - fit snugly but comfortably against the side of the face;
> - securely stay in place, covering the nose and mouth;
> - include multiple layers of fabric;
> - allow for breathing without restriction; and
> - be able to be laundered and machine-dried without damaging them or changing their shape.
>
> While not ideal, disposable, single use paper masks are also acceptable when another face covering option is not available. Unless in healthcare or other specialized settings, N95 or surgical masks should not be used as they are critical supplies and should be reserved for healthcare workers and other first responders.
>
> While plastic face shields are not considered a face covering under the guidelines outlined above, face shields may be used in instances where an individual can consistently and reliably maintain appropriate social distancing and where the University has expressly approved the use of the face shield instead of a cloth mask. Such instances may include, but not be limited to, ADA and other medical accommodations. If an individual is approved to use a plastic face shield, the shield should cover from above the eyes to below the chin to reduce the risk of the spread of respiratory particles.

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ■ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ■ Course Number
     - ■ Course Outcomes
     - ■ Course Description
     - ■ Syllabus
     - ☐ Curriculum Worksheet
     - ■ Pre-requisite or co-requisite
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ■ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ■ **Documents as listed under establishing a new course (as applicable)**
     - ■ Existing Curriculum Worksheet
     - ■ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program

- ☐ Request to Plan (RTP)
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program

- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11

- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit

- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date Feb 1. 2021
Dept. Mechanical Engineering
College School of Mines and Engineering
Program Mechanical Engineering
CRC Representative Peter Lucon

Description of Request:

Updated course based on FE results and IAB feedback to make machine design mandatory in our curriculum.

Current Course or Program Information:

Attached.

Number (Assigned By CRC):

Proposed Change

Course #	Name	Credits	Pre-req.
EMEC 455	Mechanical Component Design	3 credits	EMEC 341

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

Cleaning up curriculum to match MUS CCN and add required course.

Anticipated Impacts to "Other" Programs

None.

Impact on Library: None Anticipated. has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): Fall 2021

APPROVALS

Department Head Approval Jack L. Skinner
Date 2-24-21

Dean Approval
Date 3-1-21

Graduate Council Approval _____
Date _____

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

EMEC 455 COURSE SYLLABUS
MECHANICAL COMPONENT DEGIGN, SPRING 2022

Class Schedule: MWF 12:00 – 12:50, SE 113
Instructor: G. Steve Tarrant
Office hours: SE 310, MW 1:00-2:00, T 2:00-3:00, or by appointment
Office phone: 406-496-4738
Email: starrant@mtech.edu

PREREQUISITES: EMEC 455

TEXT: *Fundamentals of Machine Component Design*, Juvinall and Marshek, 6th edition, Wiley,
ISBN-13: 978-1-118-98768-1, or 5th Edition or 7th Edition.

COURSE OBJECTIVE: The primary objective of this course is to develop a fundamental approach to the design of specific mechanical components. Topics covered will include fasteners, journal bearings, roller bearings, gears, welds, springs, clutches, and brakes, as well as a few special topics such as explosions, pumps, and high-pressure seals, if time allows. The machine design process will nearly always include fatigue, fracture, corrosion, and basic stress analysis, combined with traditional guidelines for component design.

HOMEWORK: Problems from the text will be assigned from each of the chapters covered. The homework will not be collected or graded, but an exam over each topic will be given after the completion of that topic. The exams will be representative of the assigned homework problems.

EXAMS: There will be approximately six exams and a final exam given during the semester. Each regular exam will count as 15% of your final grade, and the final will count as 10%.

GRADING:	90 – 100%	A
	80 – 89%	B
	70 – 79%	C
	60 – 69%	D
	<60%	F

The course is directed toward specific goals and outcomes, identified by the Accreditation Board for Engineering and Technology (ABET). These goals are given below.

a) Apply knowledge of mathematics, science, and engineering
e) identify, formulate, and solve engineering problems
i) recognize the need for, and an ability to engage in, life-long learning

Approximate schedule of topics for the course:

Jan. 4-8	Fasteners
Jan. 11-15	Fasteners, cont.
Jan. 18-22	**EXAM 1 fasteners** Spur gears
Jan. 25– Jan. 29	***Monday, Jan. 18 – Martin Luther King, Jr., Day*** Spur gears, cont.
Feb. 1-5	Impact Explosions, barriers, projectiles **EXAM 2 spur gears**
Feb. 8-12	Lubrication, journal (sliding) bearings
Feb. 15-19	***Monday, Feb. 15 – Presidents' Day*** Lubrication, journal (sliding) bearings Journal bearings **EXAM 3 impact**
Feb. 22 – Feb. 26	Springs
Mar. 1-5	Springs, cont.
Mar. 8-12	**EXAM 4 sliding lubrication**
Mar. 15-19	welding
Mar. 22-Mar. 26	welding Clutches & brakes
Mar. 29-Apr. 2	**Friday, April 2, Spring mini-break** **EXAM 5 springs and welds** Clutches, brakes
Apr. 5-9	Clutches & brakes, cont.
Apr. 12-16	Clutches & brakes, cont. **EXAM 6 clutches and brakes**
Apr. 19-23	***FINAL EXAM***

This syllabus is subject to change, depending upon schedule and course progress.

Montana Tech's mask policy, Spring 2021:

We know from existing data that wearing an appropriate face covering* in public can help prevent the spread of COVID-19 in the community (Lyu & Wehby, 2020; CDC, 2020; Johns Hopkins Medicine, 2020). In accordance with policy from the Montana University System, Montana Technological University has determined that everyone will be required to wear a face covering in university buildings, including classrooms. You MUST wear a face covering appropriately (i.e., covering both your mouth and nose) in the building when you are attending class in person. Face coverings have been provided for students, instructors, and staff, and everyone is expected to wear one while inside any university building.
Anyone attending class in person without a face covering will be asked to put one on or leave. Instructors will have the option to end class if anyone present refuses to appropriately wear a face covering for the duration of class. Students who refuse to wear face coverings appropriately or adhere to other stated requirements may face disciplinary action for Code of Conduct violations. On a case-by-case basis, students may consult with the Dean of Students and/or Student Disability Resources.

* As per MUS "Updated MUS Healthy Fall 2020 Planning Guidelines: Face Covering Requirements", and appropriate face covering are defined by the following:

> Appropriate face coverings are those that cover the mouth and nose of the wearer. Following CDC guidance, effective face coverings include simple cloth masks, scarves, buffs, or bandanas.
> Based on CDC guidance, the most effective face coverings should:
>
> - fit snugly but comfortably against the side of the face;
> - securely stay in place, covering the nose and mouth;
> - include multiple layers of fabric;
> - allow for breathing without restriction; and
> - be able to be laundered and machine-dried without damaging them or changing their shape.
>
> While not ideal, disposable, single use paper masks are also acceptable when another face covering option is not available. Unless in healthcare or other specialized settings, N95 or surgical masks should not be used as they are critical supplies and should be reserved for healthcare workers and other first responders.
>
> While plastic face shields are not considered a face covering under the guidelines outlined above, face shields may be used in instances where an individual can consistently and reliably maintain appropriate social distancing and where the University has expressly approved the use of the face shield instead of a cloth mask. Such instances may include, but not be limited to, ADA and other medical accommodations. If an individual is approved to use a plastic face shield, the shield should cover from above the eyes to below the chin to reduce the risk of the spread of respiratory particles.

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - ■ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ■ Course Number
     - ☐ Course Outcomes
     - ■ Course Description
     - ☐ Syllabus
     - ■ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program

- ☐ Request to Plan (RTP)
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program
- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date 10/13/2020
Dept. Mechanical Engineering **College** SME
Program Mechanical Engineering **CRC Representative** Peter Lucon

Description of Request:

Change credits from two to three. Topics covered will remain the same, but they will be covered in more depth.

Current Course or Program Information:

Survey of common welding processes, introduction to heat flow, arc physics, welding metallurgy, design, welding symbols, weld quality, testing, codes and NDE.

Number (Assigned By CRC):

Proposed Change

Course #	Name	Credits	Pre-req.
EWLD 314	Introduction to Welding Engineering	3 (Hrs: 3 Lec.,)	PHSX 235

Description: Survey of common welding processes, introduction to heat flow, arc physics, welding metallurgy, design, welding symbols, weld quality, testing, codes and NDE.

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

Welding engineering was formerly a degree option within general engineering. Welding engineering is now focus area within mechanical engineering. The mechanical engineering department is establishing a course sequence for the welding engineering focus area. While reviewing courses and developing the welding engineering focus area course sequence, the mechanical engineering department found that expanding the EWLD 314 Introduction to Welding Engineering to three credits would allow more detailed coverage in several areas – namely arc physics, welding metallurgy, and welding codes. More detailed coverage will better prepare welding engineering students for subsequent welding engineering courses. Increasing credits and topic depth will also improve EWLD 314 as a standalone welding engineering course for students in other mechanical engineering focus areas or departments.

Anticipated Impacts to "Other" Programs

None anticipated.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): Spring 2021

MontanaTech

Curriculum Change Request Form Dated August 15, 2020

APPROVALS

Department Head Approval _____
Date 2-24-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date _____

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

EWLD 314 – Introduction to Welding Engineering

Department
Mechanical Engineering Department

Designation
Professional Elective

Credits
3 lecture credits, 0 lab credits.

Course (Catalog) Description
Survey of common welding processes, introduction to heat flow, arc physics, welding metallurgy, design, welding symbols, weld quality, testing, codes and NDE.

Prerequisites
PHSX 235

Textbook:
Welding Engineering: An Introduction, David H. Phillips, 2016, ISBN: 9781118766446

Course Goal
To gain a fundamental understanding of the science and practice of welding engineering.

Course Outcomes
Students completing EWLD 314 will have the tools to:

- Understand the fundamentals of operation of a variety of welding processes.
- Apply physics, chemistry, and engineering principles to basic welding problems.
- Appreciate implications of welding-related codes and specifications.

Topics Covered:

1. Welding Processes
    a. Arc Welding Processes
    b. Resistance Welding Processes
    c. Other Fusion Welding Processes
    d. Solid State Welding Processes
2. Welding Physics
    a. Welding Arc Physics
    b. Heat Flow
    c. Residual stress and distortion
3. Welding Design and Welding Symbols
4. Welding codes, Quality, Testing, and Nondestructive Evaluation
5. Welding Metallurgy

Grading:
Homework and Quizzes 40%
Term Paper: 10%
Mid Term Exam: 20%
Final Exam: 30%

Attendance Policy
Students are expected to regularly attend class. In the event of an emergency, please contact the instructor as soon as possible.

Students are responsible for notifying the instructor prior to planned absences (e.g. University sanctioned activities, job interviews, etc.)

Accommodations:
Students with disabilities who believe they may need accommodations in this class are encouraged to contact a Montana Tech Disability Services Coordinator (DSC) at either 406-496-4429 (North Campus) or 406-496-3730 (South Campus).

Any student who may need an accommodation due to a disability, please make an appointment to see me during my office hours. A letter from a Montana Tech Disability Coordinator authorizing your accommodations is needed.

Academic Dishonesty Policy
University policy will be followed. Refer to the Montana Tech Student Handbook available at:
https://www.mtech.edu/student-life/student-handbook.pdf

Acts of academic dishonesty include but are not limited to:

- Aiding another student in an act of academic dishonesty
- Copying from another student's paper while taking a quiz or examination
- Plagiarism
- Unauthorized signatures (use of another person's signature without authorization)
- Using unlawful aids (books, notes, cell phones or other electronic devices, etc.) to pass an examination

Electronics Policy
Cell phone (and other communication device) use is not permitted during in-class exams. Anyone found using a cell phone, computer, tablet, etc. during an exam will receive a "0" on that exam.
Cell phone, Ipod, or other entertainment device use is strongly discouraged during lecture. Computers, tablets, and similar may be used for note taking.

Prepared by: Nathan Huft **Date:** February 16, 2021

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

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See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
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- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

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     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - ■ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
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     - ☐ Course Description
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     - ■ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
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- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
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https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
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- ☐ Establishing a new postsecondary educational program

- ☐ Request to Plan (RTP)
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program

- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11

- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit

- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date 10/13/2020
Dept. Mechanical Engineering **College** SME
Program Mechanical Engineering **CRC Representative** Peter Lucon

Description of Request:

Change Pre-req. from EGEN 324 to EGEN 324 or EMEC 320..

Current Course or Program Information:

Survey of common welding processes, introduction to heat flow, arc physics, welding metallurgy, design, welding symbols, weld quality, testing, codes and NDE.

Number (Assigned By CRC):

Proposed Change

Course # Name	Credits	Pre-req.
EMEC 402 - Mechanical Engineering Laboratory	1 (Hrs: 3 Lab.)	EGEN 324 or EMEC 320 EGEN 434 , EMEC 326 , and EMEC 455.
EMEC 326 - Fundamentals of Heat Transfer Corequisite(s): EGEN 335. Course generally offered 2nd semester.	3 (Hrs: 3 Lec.)	EGEN 324 or EMEC 320
EGEN 434 - Applied Thermodynamics II	3 (Hrs: 3 Lec.)	EGEN 324 or EMEC 320

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

Updated ME curriculum for EMEC 320 instead of EGEN 324, so we want the either or, to allow other engineering students to take these higher level classes as well.

Anticipated Impacts to "Other" Programs

None anticipated.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): Spring 2021

APPROVALS

Department Head Approval _____
Date 2-24-21

Dean Approval _____
Date 3-1-21

Graduate Council Approval _____
Date _____

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

Curriculum Change Request Form Dated Jan 24, 2021

APPROVALS	Date and Signature
Department Head	2-24-21
Dean Approval	3-1-21
Graduate Council	
CRC	3.30.21
Faculty Senate	

Campus Approvals Level I *(must be approved by the VCAA <u>prior</u> to CRC submission):*
OCHE Approvals Level I & II *(must be approved by the VCAA and Chancellor prior to CRC submission)*

VCAA Approval	
Chancellor Approval	

Curriculum Change Request Form Dated Jan 24, 2021

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval. **Directions found at the end of the document and can be deleted before forwarding to the CRC. Complete sections**
Please indicate the type of request(s) by selecting *all that apply*:

☑ ***Faculty Approvals** (directly to CRC, then Faculty Senate):*
☐ ***Campus Approvals Level I** (must be approved by the VCAA prior to CRC submission):*
☐ ***OCHE Approvals Level I** (must be approved by the VCAA and Chancellor prior to CRC submission)*:
☐ ***OCHE Approvals Level II*** Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

1. Date March 16, 2021
2. Department Interdisciplinary Arts & Sciences (IAS)
3. College CLSPS
4. Program IAS
5. CRC Rep. Dawn Atkinson

6. Description of Request: List options for some General Education requirements
Remove ENST 476 Environmental Citizenship from the catalog.

7. Current Course or Program Information: ENST 476 Environmental Citizenship

8. Proposed Change As appearing in the catalogue. A new course requires the course outcomes listed in this area.
Course #Name: ENST 476 Environmental Citizenship **Credits:** 3 **Pre-req:** None
Description: ENST 476 - Environmental Citizenship, 3 credits
Our focus is on understanding both the context of and the practical uses for environmental communication. The issues covered in the course include:

- Conceptual and historical contexts
- Media and the environment
- Environmental movements, organizations, and campaigns
- Environmental controversies
- Environmental dangers, risk communication, and the public

In addition to environmental communication, we will also gain an overview of related environmental fields-including philosophy, science, history, and politics.

Course Outcomes: (if required) ENST 476 is an existing course.

9. Assessment Leading to Request: ENST 476 has not been taught at Montana Tech since Spring 2020. Robin Saha, Associate Professor in the Environmental Studies Program at UM-Missoula, has been teaching the course since 2012 and has submitted paperwork to change the course name, description, and level. The new course name is ENST 476 Community Sustainability in Practice, and it is offered to both graduate and undergraduate students. The new description reads "Project-based, capstone-like course that develops student sustainability practice, leadership and environmental citizenship competencies." The description is considerably different than Montana Tech's ENST 476 course. As a matter of common course numbering policy, Montana Tech must either (1) remove its course from the catalog and retitle it; (2) align its course description and title with UM, although Montana Tech's version has a very different focus; or (3) stand its ground with UM, which doesn't demonstrate a collaborative work ethos, is counterproductive since Dr. Saha has already submitted the paperwork to change the course, and is unreasonable because the course is taught every year at UM but has only been taught at Montana Tech twice in Spring 2019 and Spring 2020. Since the course is not regularly taught at Montana Tech and because Dr. Saha is making his changes this semester to update the course for Fall 2021, this form requests removing the course from the Montana Tech catalog. Dawn Atkinson has communicated with Janet Friesz about this matter, and she supports the removal. If the course is taught again at Montana Tech, the IAS department head can reinstitute the course using a unique designator or align the course with the UM course title and description.

10. List of supporting documentation attached: See *Level of Request* for requirements.

11. Impacts:

☑ No impact to Library or
☐ _____consulted with _____from the library to ensure needed materials and media are available
☐ No anticipated impact to other programs or
☐ _____consulted with _____from _____and

Curriculum Change Request Form Dated Jan 24, 2021

APPROVALS	Date and Signature
Department Head Dawn Atkinson	3/16/2021
Dean Approval Karen Van Dameer	3/16/2021
Graduate Council	
CRC	4/16/24
Faculty Senate	

Campus Approvals Level I *(must be approved by the VCAA prior to CRC submission):*
OCHE Approvals Level I & II *(must be approved by the VCAA and Chancellor prior to CRC submission)*

VCAA Approval	
Chancellor Approval	

APPROVALS

Department Head Approval Anton Petrov
Date: March 15, 2021

Dean Approval Karen VanDamme
Date 3-15-21

Graduate Council Approval _____
Date _____

CRC Approval T Stock
Date 4/6/2021

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

Date March 15, 2021
Dept. Trades and Technical **College:** Highlands College
Program: Precision Machining **CRC Representative:** Tony Patrick

Description of Request: Remove curriculum, add curriculum, and change credits. This is based on our desire to have the two-year AAS degree with the ability to move on to a BAS in business with a machining emphasis.

Current Course or Program Information: Precision Machining AAS degree changes

Number (Assigned By CRC): _____

Proposed Changes:

Course #	Name	Credits
Delete the following courses:		
MCH 230	Tooling & Fixtures Used In CNS	3
W 100	Composing Mindfully: Writing Fundamentals	3
COMX 115	Interpersonal Communications	3
MCH 220	Geometric Dimensioning & Tolerancing	3
ACTG 101	Accounting Procedures I	3
Add the following courses:		
BGEN 105	Introduction to Business	3
BGEN 235	Business Law	3
ACTG 201	Prin. of Financial Accounting	3
ECNS 201 or ECNS 203	Prin. of Microec. Or Prin. of Micro/Macro	3
STAT 216 or STAT 131	Introduction to Statistics or Biostatistics	3
Add "or" to the following:		
CAPP 131 **or** CAPP 156	Basic MS Office or MS Excel	3
M 105 **or** M 121	Contemporary Math or College Algebra	3
W 101 **or** W 121	College Writing or Intro. to Tech. Writ.	3
Change credits for the following:		
MCH 265	Advanced Machining & Manufacturing	4 to 3 credits
MCH 291	Special Topics	4 to 3 credits

PRECISION MACHINING AAS CURRICULUM SHEET			
COURSE NO.	**TITLE**	**CREDITS**	**SEMESTER COMPLETED**
	FIRST SEMESTER		
MCH 268	CNC Machining I	3	
MCH 120	Blueprint Reading & Interpretation for Machining	3	
MCH 160	Machine Shop I	3	
MCH 245	Shop Practices	3	
MCH 129	Machine Quality Control & Precision Measurements	3	
M 105 OR M 121	Contemporary Math OR College Algebra	3	
TOTAL CREDITS		**18**	
	SECOND SEMESTER		
MCH 260	Machine Shop II	3	
MCH 235	CNC Milling Programming & Operations Level I	3	
MCH 231	CNC Turning Operations Level I	3	
W 101 OR W 121	College Writing OR Introduction to Technical Writing	3	
MCH 130	Machine Shop Essentials	3	
TOTAL CREDITS		**15**	
A student exiting program after second semester would be awarded a Certificate of Applied Science in Machining Technology.			
	THIRD SEMESTER		
MCH 265	Advanced Machining & Manufacturing	3	
MCH 240	Metallurgy	3	
MCH 236	CNC Milling Programming & Operations Level II	3	
CAPP 131 OR CAPP 156	Basic MS Office or MS Excel	3	
***BGEN 235**	Business Law	3	
ECNS 201 or ECNS 203	Principles of Microeconomics OR Principles of Microeconomics and Macroeconomics	**3**	
TOTAL CREDITS		**18**	
	FOURTH SEMESTER		
BGEN 105	Introduction to Business	3	
MCH 227	Swiss CNC & Mill-Turn Systems	3	
MCH 232	CNC Turning Programming & Operations Level II	3	
MCH 291	Special Topics	3	
ACTG 201	Principles of Financial Accounting	3	
STAT 216 or STAT 131	Introduction to Statistics **or** Biostatistics	3	
TOTAL CREDITS		**18**	
	TOTAL CREDITS FOR FOUR SEMESTERS	**69**	

***Fall Only**

Summary of EE Requests:

Check GC approval for 5540

1. Change pre-req for EELE 486
2. Drop "W" designation and cross-listing for EELE 488
3. Drop cross-listing for EELE 489
4. Add pre-req for EELE 5540
5. Add another option for completing the "Fundamental Engineering Elective" portion of the curriculum

Curriculum Change Request Form Dated August 15, 2020

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.
Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):
☐ Electronic Copy (with the exception of signatures- no handwritten items)
☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
☐ Naming Convention as determined by CRC

LEVEL of Request
Please indicate the type of request(s) by selecting *all that apply*:
1. Faculty Approvals (directly to CRC, then Faculty Senate):

✠ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:

- ☐ Course Number
- ☐ Course Outcomes
- ☐ Course Description
- ☐ Syllabus
- ☐ Pre-requisites or co-requisites
- ☐ Existing Curriculum Worksheet
- ☐ New Curriculum Worksheet, with changes highlighted

☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:

- ☐ **Documents as listed under establishing a new course (as applicable)**
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- ☐ New Curriculum Worksheet, with changes highlighted

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date	March 1, 2021	College	SME
Dept	Elec. Eng.	CRC Representative	
Program	Elec. Eng.		

Description of Request: **Change pre-req for EELE 486**

Current Course or Program Information: EELE 486 - Fundamentals of Engineering Exam for EE; 1 credit (Hrs: 1 Lec.); Review for preparation for the Fundamentals of Engineering Exam (Electrical Engineering specific). Students must take FE exam to complete course requirements. Pass/Fail. Prerequisite(s): Graduating senior 1st & 2nd

Number (Assigned by CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req
EELE 486	Fundamentals of Engineering Exam for EE	1 credit (Hrs: 1 Lec.) Pass/Fail	Prerequisite(s): EELE 321 and EELE 445. Course generally offered 1st and 2nd semesters.
Review for preparation for the Fundamentals of Engineering Exam (Electrical Engineering specific). Students must take FE exam to complete course requirements. Pass/Fail.			

List of Supporting Documentation:

1. Syllabus is attached.

Assessment Leading to Request: Successful completion of the FE Exam requires knowledge of all aspects of the EE curriculum. Current prerequisite is nebulous and difficult for the Registrar to administer. Registrar currently uses "Senior Standing" as a proxy for "Graduating Senior". The new prerequisites will more accurately fulfill the faculty recommendation that students take this course in their last semester prior to graduation.

Anticipated Impacts to Other Programs: None

Anticipated Impact to Support Services (e.g. Facilities, OSP, Bookstore, Library): None

Due to Take Effect: August 15, 2021

Approvals

Title	Signature	Date
Department Head	MK Dodd	3/8/2021
Dean	Dan Trudnowski	3/16/2021
Graduate Council	N/A	
CRC	Theresa Stack	4/12/2021
Faculty Senate		
VCAA		
Chancellor		

Curriculum Change Request Form Dated August 15, 2020

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See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
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LEVEL of Request
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- ☐ Course Outcomes
- ☐ Course Description
- ☐ Syllabus
- ☐ Pre-requisites or co-requisites
- ☐ Existing Curriculum Worksheet
- ☐ New Curriculum Worksheet, with changes highlighted

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- ☐ **Documents as listed under establishing a new course (as applicable)**
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EELE 488

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date	March 1, 2021	College	SME
Dept	Elec. Eng.	CRC Representative	
Program	Elec. Eng.		

Description of Request: **Drop "W" designation and cross-listing from EELE 488**

Current Course or Program Information: EELE 488W - Electrical Engineering Design I: 2 credits (Hrs: 1 Lec., 3 Lab) The first semester of a capstone engineering design sequence that requires students to apply engineering principles to a project either selected by instructor or the student with instructor's approval, or provided by industry. Students shall develop a design proposal that includes requirement and multiple constraints, and initiate work on the project. Cross listed with EGEN 489W.

Number (Assigned by CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req
EELE 488	Electrical Engineering Design I	2 credits (Hrs: 1 Lec., 3 Lab)	Prerequisite(s): EELE 317; Corequisite(s): EELE 321 or EELE 445. Course generally offered 1st semester.
The first semester of a capstone engineering design sequence that requires students to apply engineering principles to a project either selected by instructor or the student with instructor's approval, or provided by industry. Students shall develop a design proposal that includes requirement and multiple constraints, and initiate work on the project. **Note to Registrar: Also drop cross-listing with EGEN 489. It is no longer applicable.**			

List of Supporting Documentation:

1. Syllabus is attached.
2. Related catalog requirement reads: Designated Writing Course: All baccalaureate degrees include one designated writing course at the 300 or 400 level. A 400 level course should be a capstone experience in the student's major. The writing component of a course generally takes one of two forms: 1. The course requires at least three (3), three to five (3 - 5) page papers, and students must write a substantial revision of at least one of these papers; OR 2. The course requires one major paper of 15 to 20 pages, and students must produce an early draft of this paper for feedback from the instructor, then make subsequent revisions.

Assessment Leading to Request: Faculty received input from IAB that writing skills needed attention. Faculty reviewed overall communications outcomes. DH researched purpose of "W" designation and found the catalog entry above. Faculty believe EELE 488 does not meet the content threshold to be considered a designated writing course. Writing content is included in WRIT321 and EELE489, both of which are required. The approval and accreditation of separate ME and CE degree programs makes the cross-listing obsolete.

Anticipated Impacts to Other Programs: None

Anticipated Impact to Support Services (e.g. Facilities, OSP, Bookstore, Library): None

Due to Take Effect: August 15, 2021

Approvals

Title	Signature	Date
Department Head	MK Dahl	3/8/2021
Dean	Dan Trudnowski	3/16/2021
Graduate Council	N/A	
CRC	Theresa Stack	4/5/2021
Faculty Senate		
VCAA		
Chancellor		

Curriculum Change Request Form Dated August 15, 2020

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See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
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LEVEL of Request
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- ☐ Course Number
- ☐ Course Outcomes
- ☐ Course Description
- ☐ Syllabus
- ☐ Pre-requisites or co-requisites
- ☐ Existing Curriculum Worksheet
- ☐ New Curriculum Worksheet, with changes highlighted

☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:

- ☐ **Documents as listed under establishing a new course (as applicable)**
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- ☐ New Curriculum Worksheet, with changes highlighted

FELE 489W

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date	March 1, 2021	College	SME
Dept	Elec. Eng.	CRC Representative	
Program	Elec. Eng.		

Description of Request: **Drop cross-listing from EELE 489W**

Current Course or Program Information: EELE 489W - Electrical Engineering Design II: 2 credits (Hrs: 1 Lec., 3 Lab) The second semester of a capstone engineering design sequence that requires students to apply engineering principles to a project either selected by instructor or the student with instructor's approval, or provided by local industry. Students shall complete the design. Cross listed with EGEN 499W.

Number (Assigned by CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req
Note to Registrar: Drop cross-listing with EGEN 499. It is no longer applicable.			

List of Supporting Documentation:

1. None.

Assessment Leading to Request: The approval and accreditation of separate ME and CE degree programs makes this cross-listing obsolete.

Anticipated Impacts to Other Programs: None

Anticipated Impact to Support Services (e.g. Facilities, OSP, Bookstore, Library): None

Due to Take Effect: August 15, 2021

Approvals

Title	Signature	Date
Department Head	MKDell	3/8/2021
Dean	Dan Trudnowski	3/16/2021
Graduate Council	N/A	
CRC	Theresa Stack	4/12/2021
Faculty Senate		
VCAA		
Chancellor		

Curriculum Change Request Form Dated August 15, 2020

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https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):
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☐ Naming Convention as determined by CRC

LEVEL of Request
Please indicate the type of request(s) by selecting *all that apply*:
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✠ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:

- ☐ Course Number
- ☐ Course Outcomes
- ☐ Course Description
- ☐ Syllabus
- ☐ Pre-requisites or co-requisites
- ☐ Existing Curriculum Worksheet
- ☐ New Curriculum Worksheet, with changes highlighted

☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:

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FELE 554

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date	March 1, 2021	College	SME
Dept	Elec. Eng.	CRC Representative	
Program	Elec. Eng.		

Description of Request: **Add pre-req to EELE 554**

Current Course or Program Information: EELE 5540 - Power System Operation and Control; 3 credits (Hrs: 3 Lec.); An introduction to power system operations and control, including the study of load-frequency control, control of reactive resources, economic dispatch, locational marginal pricing and integration of renewable resources. Power system stability is also introduced. Prerequisite(s): EELE 454. Course offered on demand.

Number (Assigned by CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req
EELE 5540	Power System Operation and Control	3 credits (Hrs: 3 Lec.)	Prerequisite(s): EELE 454 and EELE 203. Course offered on demand.
An introduction to power system operations and control, including the study of load-frequency control, control of reactive resources, economic dispatch, locational marginal pricing and integration of renewable resources. Power system stability is also introduced.			

List of Supporting Documentation:

1. Syllabus is attached.

Assessment Leading to Request: Course requires knowledge of dynamic systems. Instructor became aware of a pathway to the course wherein students could meet the existing pre-req without any knowledge of dynamic systems. Students normally take EELE 203 in their junior year. Faculty discussed the issue, and concluded that adding this pre-req prevents unprepared students from enrolling in the course without a detrimental impact on students who wish to take the course as either a professional elective or as part of their grad curriculum.

Anticipated Impacts to Other Programs: None

Anticipated Impact to Support Services (e.g. Facilities, OSP, Bookstore, Library): None

Due to Take Effect: August 15, 2021

Approvals

Title	Signature	Date
Department Head	[signature]	3/8/2021
Dean	Dan Trudnowski	3/16/2021
Graduate Council		need sig.
CRC	Theresa Stack	4/12/2021
Faculty Senate		
VCAA		
Chancellor		

Curriculum Change Request Form Dated August 15, 2020

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See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
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Submission Requirements: All Submissions (checked by CRC):
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LEVEL of Request
Please indicate the type of request(s) by selecting *all that apply*:
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- ☐ Course Outcomes
- ☐ Course Description
- ☐ Syllabus
- ☐ Pre-requisites or co-requisites
- ☐ Existing Curriculum Worksheet
- ☐ New Curriculum Worksheet, with changes highlighted

✠ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
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- ☐ New Curriculum Worksheet, with changes highlighted

FUNDAMENTAL ENG ELECTIVE

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date	March 1, 2021	College	SME
Dept	Elec. Eng.	CRC Representative	
Program	Elec. Eng.		

Description of Request: **Add Thermo option to core curriculum as Fundamental Engineering Elective**

Current Course or Program Information: Current curriculum requires that students complete either EGEN 324 Applied Thermodynamics or EGEN 335 Fluid Mechanics.

Number (Assigned by CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req
FE Elect. – Fundamental Engineering Elective (see *FEElect note below) Footnote FEElect : Fundamental engineering electives must be one of EGEN 324 Applied Thermodynamics; EGEN 335 Fluid Mechanics; or EMEC 320 Thermodynamics			

List of Supporting Documentation:

1. Curriculum Worksheet is attached.

Assessment Leading to Request: ME department recently created a new course, EMEC 320, to replace EGEN 324 in their curriculum. The new course adds M 273 as a prerequisite, and is described as containing more theory and less applied content than the existing course. The new course will be more rigorous. Faculty concur that the intent of the existing Fundamental Engineering Elective requirement is to fulfill the department's mission to "Provide a quality education that stresses the fundamentals of engineering..." Faculty wish to have the ability to advise EE students into the more rigorous course. A side-benefit of the proposed change is that it will open up another time slot and may allow students more latitude in adjusting their schedule to incorporate the Fundamental Engineering elective.

Anticipated Impacts to Other Programs: None

Anticipated Impact to Support Services (e.g. Facilities, OSP, Bookstore, Library): None

Due to Take Effect: August 15, 2021

Approvals

Title	Signature	Date
Department Head	MK Dall	3/8/2021
Dean	Dan Trudnowski	3/16/2021
Graduate Council	N/A	
CRC	Theresa Stack	4/12/2021
Faculty Senate		
VCAA		
Chancellor		

EELE 554
Power System Operation and Control
Fall 2020

Instructor: Dr. M.K. Donnelly, Main206c, 496-4846, mdonnelly@mtech.edu

Designation: Professional Elective for Electrical Engineering

Lecture: W 1200-1315; R 1700-1815

Text: Required: None.
Recommended: Power System Analysis and Design, 5th Ed., Glover and Sarma.

Software: The Power System Toolbox in Matlab; Powerworld; PSLF (Positive Sequence Load Flow). All software will be provided.

Prerequisites: EELE 454 and EELE 203

Course Description:
An introduction to power system operations and control, including the study of load-frequency control, control of reactive resources, economic dispatch, locational marginal pricing and integration of renewable resources. Power system stability is also introduced.

Course Learning Outcomes:
In support of the Department's outcomes, at the completion of the course, students will be able to:

1. Understand in considerable detail the concepts of load-frequency control.
2. Understand in considerable detail the concepts of reactive resource management and voltage control in a power system.
3. Understand basic power system stability concepts.
4. Understand the use of SCADA and synchrophasors in power system operations.
5. Understand state estimation.
6. Have detailed knowledge of at least one contemporary issue facing the electric power industry.

Contribution of course to meeting the requirements of Criterion 5:
Engineering topic

Topics Covered:

1. Load-frequency control
2. Voltage control
3. Economic dispatch and OPF
4. SCADA
5. State estimation
6. Power system stability

Grading: There will be 3 exams, two projects, homework and quizzes.

Tests and projects (equally weighted)	85%
Homework and quizzes	15%
TOTAL	100%

Policies: Students are expected to attend all lectures. Reading assignments are to be completed **BEFORE** class. Missed exams must be **prearranged** with the professor and are granted only under legitimate excuses.

Person who prepared this description: Matt Donnelly
Date of preparation: August 2020

EELE 488/9, Engineering Research, Development and Design (CRN 73438)

Instructor: Bryce Hill, Main 316A, (406) 496-4752, bhill@mtech.edu

Designation: Required for Electrical Engineering.

Lecture: T 2:00-2:50 pm, ELC 225 (1 credit)

Text: none

A 2 semester sequence, 2 credits the first semester and 1 credit the second semester. The first semester is 1 hour of lecture and 3 hours of lab. The second semester is 3 hours of lab. The courses must be taken in sequence. The student must have senior status and compliance to the following perquisite and co requisite constraints to start the sequence:

- Electrical Engineering: EELE 317 prerequisite and EELE 445 co requisite

A capstone-engineering 2 semester design course that requires students to apply engineering principles to a project either selected by the instructor or the student with the instructor's approval, or provided by local industry. Projects will require application of knowledge and/or talents in the diverse areas of mathematics, physics, engineering, economics, and personal interaction. Written reports are required and must be prepared with word processors, spreadsheets, data base software, and CAD packages.

This class does not serve as the last class you will take, but the first job you will have. The Electrical Engineering department will strive to provide all of the projects to the students. Each project will be presented as a job to be accomplished with a description, the project advisor. Students will "apply" for each job with a resume and an application letter. During the first week the students prepare this material. During the second week the advisors for each project rank the students who have applied for each project. The program director then distributes the students to each project based on the ranking of the advisors. After the second week, all of the students will have an advisor and a project. It is noted that you do not get to choose your group or your project directly. This is more true to life in the real world, where you do not get to choose your assignment or your team. Some of these projects are multi-disciplinary working with many of the other departments' students to accomplish a task that is not exclusively electrical in nature.

A total of four-group presentations, Design Reviews (DR), will be given, 2 in each semester. In the first semester one ten minute Concept Design Review (CDR) AKA design problem presentation and one fifteen minute Preliminary Design Review (PDR) focusing on requirements, constraints, deliverables, schedule/budget and a conceptual design. An additional deliverable for the first semester the preliminary design report is to be submitted to your mentor. In the second semester one 15 minute Intermediate Design Review (IDR) on why the chosen design chosen meets the requirements and constraints,

engineering (analysis), test plans and progress presentation, and a fifteen minute Final Design Review (FDR) final presentation and test validation results that show the working prototype meets all the requirements and constraints. For all of the 4 DR's each group will insure that their faculty advisor or representative is present to evaluate and assign Action Items (AI). Each DR will likely be assigned some AI's. The satisfactory resolution of each AI will be completed by the team and approved by the faculty advisor and then turned into the class instructor within no more than 2 weeks after the DR. In the FDR AI's will be done before start of finals week. Your group's final project will be evaluated per your mentor's judgment of how well you met your deliverables and the quality of your design. General presentation format will be discussed in class but the group mentor will have final say on all material and format.

Sometimes members of a team find they are not compatible. If the instructor is informed of this, he will correct the problem up to the fourth week of the semester. After the fourth week the team members will have to compromise and get along as would engineers in a real job situation.

The college catalog states that 3 hours of outside study are normal for every hour spent in class. A 3-credit course has about 40 hours of classes. This means the work you do for this course should be what a new B.S. Engineer could do in 160 hours of on the job work (3x160=480 man hours per group). This is what total effort should show per group in this class.

Each team will keep an engineering logbook, not individually. The logbook will be a record of all your own thoughts, ideas, sketches, and calculations that become your intellectual property. The form or style of your entries is your discretion. You will start making entries the in the logbook the second week of the semester. Your team's logbook will be collected periodically evaluated and graded. Each grade is worth about a quiz grade. Logbooks are used extensively in industry and even have been submitted as a legal document. If the project chooses to create the log-book electronically. They will still have a hard copy journal as print out each page kept in a binder. Each printed page will be initialed and dated by a team member. Periodically and unannounced, logbooks will be collected and a grade of up to 10pts assigned to new pages since last log inspection. The grade will be the instructor's evaluation of progress since the last inspection. **Each group must meet with their advisor weekly and submit to him a progress report. A copy of that progress report initialed by him must be inserted in your log book. Failure to keep these initialed progress reports will impact the log book grade.**

Models, working prototype, test plans, test procedures, test results that show compliance to requirements, fabrication-assembly-detailed-layout-etc drawings are expected for your design. This is typically where design teams lose points. They do not develop complete, thorough documentation and testing to requirements for their designs.

Course Outcomes: This course will address the following ABET outcomes:

(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
(3) an ability to communicate effectively with a range of audiences
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Course Outcome Indicators:

(2.1) apply design to produce solutions that meet specified needs (Advisor rubric grade from final report)
(2.2) conduct design that considers constraints such as public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors (Advisor rubric grade from final report)
(3.1) writing communication
(3.2) oral communication (Presentation Faculty/IAB rubric)
(4.1) recognize ethical and professional responsibilities in engineering situations and make informed judgments
(4.2) the impact of engineering solutions in an economic context
(5.1) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
(7.1) acquire and apply new knowledge as needed, using appropriate learning strategies

The following is the class schedule. Each week's topic will be presented by the instructor or by an invited guest lecturer with expertise with the subject. Much of this material is the essence of the aspects engineering in a modern work-place environment. At the end of each lecture a test may be given on the material covered. Notice that there is a series of lectures with quizzes. Students should not miss these as there will be **NO make-ups for any reason.**

Schedule:

First Semester

Item	Topic
1	Introduction-What Is Design? The Design Process. Design Reviews
2	Design Problem Presentation 1. CDR
3	Design Requirements. Design Constraints (in class quiz)
4	Engineering-Ethics. (in class quiz)
5	Health and Safety in Design-OSHA (guest lecturer and in class quiz)
6	Intellectual Property-Patents, Copy Right, Trade Secrets etc. (in class quiz)
7	Global Economics and Design (in class quiz)

8 Design Sustainability And Manufacturability
9 Environmental Aspects In Design. (guest lecturer and in class quiz)
10 Social and Cultural Sensitivity (guest lecturer and in class quiz)
11 Design Problem Presentation 2, PDR (end of first semester)
all requirements, all constraints, a couple of approaches, a down selection, all project plans.

Second Semester (do it)

12 Design Problem Presentation 3, IDR.
13 Student Final Design Presentations 4, FDR
14 Student Final Design Presentations 4, FDR
15 Tech-Expo poster-board specific details TBD

Engineering Design Preliminary Design Report Format (1st Semester)
(Suggested format, mentor will provide specifics)

Sect. 1 Abstract
Sect. 2 Project Definition

- Background
- Problem Statement
- Deliverables
- Detailed Design Requirements
- Detailed Design Constraints
- Test Plans

Sect. 3 Conceptual designs and down selection to a optimum approach

Sect. 4 Detailed project schedule and budget

Engineering Design Final Report Format (2nd Semester)
(Suggested format, mentor will provide specifics)

Sect. 1 Abstract

Sect. 2 Project Definition

- Background
- Problem Statement
- Deliverables
- Detailed Design Requirements
- Detailed Design Constraints
- Test Plans

Sect. 3 Conceptual designs and down selection to the optimum approach

Sect. 4 Body-to include but not exclusive to

- Design process

- Evaluation
- Analysis

Sect. 5 Compliance to requirements
- Proof through analysis
- Proof through testing

Sect 6 Compliance to relevant constraints based on the following example criteria.
- Economics
- Environmental
- Social, political, global and ethical
- Health and safety
- Sustainability, Manufacturability

Sect. 7 Fabrication, Documentation, Check-Out and Test

Sect. 8 Conclusions

Your first assignment is to define your design group, select a design problem and advisor, write a design problem statement, and design deliverables. This will be presented in a ten-minute CDR presentation next week. Present your group, design problem statement, what you are going to do and your deliverables. Turn in your design information sheet signed by your advisor.

Grading:

The first semester grade will be a letter grade, based participation in lectures, project notebook, presentations and on your mentor's evaluation of your design development activity throughout the semester and your end of first semester report. Students that do not receive a passing grade for the first semester are not eligible to take the second semester portion of the class.

75%: Quiz Results, Presentations and project notebook

25%: Feedback from the faculty advisor/mentor

The second semester grade will be a letter grade as well based on your mentor's evaluation of your design development activity throughout the project, the presentations, the end of second semester report and the quiz results from the first semester. Make-up for missed quiz lectures will not be given.
The second semester a letter grade will be assigned per the following is the breakdown:

90%: mentor evaluation of individual contribution to over-all design, design reports and project deliverables.

10%: quiz results, presentations and project notebook.

EE Course Curriculum, 2020-2021 Catalog (FINAL)		Check Box	Crs.	Hrs. Lec.	Hrs. Lab	Co-Req	Pre-Req	Semester Offered
Freshman Fall								
M 171	Calculus I		3	3			see *math note below	1st,2nd
EGEN 101	Introduction to Engineering Calculations & Problem Solving		3	2	3	M 151		1st,2nd
CHMY 141	College Chemistry I		3	3		M 151 or higher		1st,2nd
CHMY 142	College Chemistry Laboratory I		1	1	2	CHMY 121 or 141		1st
WRIT 1xx	101 - College Writing I, or 121 - Intro to Technical Writing (pref)		3	3				1st,2nd
HUMN or SS	Humanities or Social Sci. Elective (see *humn/ss note below)		3	3				
EGEN 194	Freshman Engineering Seminar		1	1		EGEN 101		1st,2nd
			17	16	5			
Freshman Spring								
CSCI 117	Programming with Matlab		3	3		M 151		1st,2nd
M 172	Calculus II		3	3			M 171	1st,2nd.
PHSX 234	General Physics - Mechanics		3	3		M 172	M 171	1st,2nd
EELE 101	Introduction to Electrical Fundamentals		1		3	M 151		2nd
Free Elect.	Free Elective (see *Free Elect. note below)		3					
HUMN or SS	Humanities or Social Sci. Elective (see *humn/ss note below)		3	3				
			16	12	3			
Sophomore Fall								
EELE 201	Circuits I for Engineering		3	3		M 172		1st,2nd
EELE 202	Circuits I for Engineering Lab		1		3	EELE 201		1st,2nd
M 273	Multivariable Calculus		4	4			M 172	1st,2nd
PHSX 235	General Physics - Heat, Sound, & Optics		3	3		M 273	M 172, PHSX 234	1st,2nd
PHSX 236	General Physics - Heat, Sound, & Optics Lab		1		3	PHSX 235	PHSX 234	1st
CSCI 1XX	112 - Programming with C I, or 135 - Fund. Of CS I		3	2	3	M 151		1st, 2nd
ECNS 2XX	201 - Micro Econ, 202 - Macro Econ, 203 Micro/Macro Econ		3	3			Sophomore standing or COI	1st,2nd
			18	15	9			
Sophomore Spring								
EGEN 201	Engineering Mechanics - Statics		3	3			PHSX 234	1st,2nd
EELE 261	Intro to Logic Circuits		3	2	3		EELE 201, 202	2nd
M 274	Introduction to Differential Equations		3	3			M 273	1st,2nd
PHSX 237	General Physics - Electricity, Magnetism & Motion		3	3		M 274	M 273, PHSX 234, 235	1st,2nd
PHSX 238	General Physics - Electricity, Magnetism & Motion Lab		1		3	PHSX 237	PHSX 235	2nd
CSCI 255	Introduction to Embedded Systems		3	2	3		CSCI 112, 135, or COI	1st
			16	13	9			
Junior Fall								
EELE 203	Circuits II for Engineering		4	3	3	M 274	EELE 201, 202	1st
EGEN 202	Engineering Mechanics - Dynamics		3	3			EGEN 201, M 172	1st,2nd
M 333	Matrices & Linear Algebra		3	3			M 172	1st,2nd
EELE 355	Electric Machinery Fundamentals (*core)		3	2	3		EELE 201, EELE 202	1st,2nd
PHSX 423	Electricity & Magnetism I		3	3		see *em1	see *em2 note below	1st
EELE 394	Seminar		1	1			EELE 201 and EELE 261	1st
			17	15	6			
Junior Spring								
EELE 320	Process Instrumentation and Control		4	3	3		EELE 201, 202	1st,2nd
WRIT 321W	Advanced Technical Writing		3	3			see *atw note below	1st,2nd
EELE 317	Electronics (*core)		4	3	3		EELE 203	2nd
EELE 308	Signals and Systems Analysis (*core)		4	3	3		EELE 203	2nd
EELE 454	Power Systems Analysis		3	3			EELE 355	2nd
			18	15	9			
Senior Fall								
EELE 321	Intro to Feedback Controls (*core)		3	2	3		EELE 203, 320, or 308	1st
EELE 445	Telecommunications Systems (*core)		3	2	3		EELE 317, EELE 308	1st
STAT 332	Statistics for Sci. and Eng.		3	3			M 172	1st,2nd
EELE 488W	Electrical Engineering Design I (*core)		2	1	3	EELE 321 or EELE 445	EELE 317	1st
BGEN 363	Business Ethics and Decision Making		3	3				
Prof. Elect.	Professional Elective (see *PrEl note below)		3	3				
			17	14	9			
Senior Spring								
EELE 489W	Electrical Engineering Design II (*core)		2	1	3		EELE 488W	2nd
EELE 486	Fundamentals of Engineering Exam for EE		1	1			graduating senior	1st,2nd
EGEN 325	Engineering Economy Analysis		3	3			Junior standing	1st,2nd
EGEN 3xx	324 - Applied Thermodynamics, or 335 - Fluid Mechanics		3	3			see *egen1 note below	1st,2nd
Prof. Elect.	Professional Elective (see *PrEl note below)		6	6				
			15	14	3			
		total credits for graduation	134					

*Free Elect.	Any 1xx course or higher
*math	Prerequisite: ACT above 27, or SAT above 610, or M 151 or equivalent
*humn/ss	see Catalog for list of approved HUMN and SS courses meeting the general ed requirement. EE requires 3 cr. of HUMN electives and 3 cr. of SS electives in addition to ECNS 2xx and BGEN363, which are required.
*PrEl	Professional Electives are restricted to EELE 400 level or higher excluding EELE 498
*em1	Corequisite: EELE 203 or M 405 or PHSX 453 or consent of instructor
*em2	Prerequiste: M 274, PHSX 237, PHSX 238
*egen1	The prerequiste for EGEN 324 is PHSX 235, the prerequiste for EGEN 335 is EGEN 201 and M 172

EXISTING WORKSHEET

EE Course Curriculum, 2021-2022 Catalog (DRAFT)		Check Box	Crs.	Hrs. Lec.	Hrs. Lab	Co-Req	Pre-Req	Semester Offered
Freshman Fall								
M 171	Calculus I		3	3			see *math note below	1st,2nd
EGEN 101	Introduction to Engineering Calculations & Problem Solving		3	2	3	M 151		1st,2nd
CHMY 141	College Chemistry I		3	3		M 151 or higher		1st,2nd
CHMY 142	College Chemistry Laboratory I		1	1	2	CHMY 121 or 141		1st
WRIT 1xx	101 - College Writing I, or 121 - Intro to Technical Writing (pref)		3	3				1st,2nd
HUMN or SS	Humanities or Social Sci. Elective (see *humn/ss note below)		3	3				
EGEN 194	Freshman Engineering Seminar		1	1		EGEN 101		1st,2nd
			17	16	5			
Freshman Spring								
CSCI 117	Programming with Matlab		3	3		M 151		1st,2nd
M 172	Calculus II		3	3			M 171	1st,2nd.
PHSX 234	General Physics - Mechanics		3	3		M 172	M 171	1st,2nd
EELE 101	Introduction to Electrical Fundamentals		1		3	M 151		2nd
Free Elect.	Free Elective (see *Free Elect. note below)		3					
HUMN or SS	Humanities or Social Sci. Elective (see *humn/ss note below)		3	3				
			16	12	3			
Sophomore Fall								
EELE 201	Circuits I for Engineering		3	3		M 172		1st,2nd
EELE 202	Circuits I for Engineering Lab		1		3	EELE 201		1st,2nd
M 273	Multivariable Calculus		4	4			M 172	1st,2nd
PHSX 235	General Physics - Heat, Sound, & Optics		3	3		M 273	M 172, PHSX 234	1st,2nd
PHSX 236	General Physics - Heat, Sound, & Optics Lab		1		3	PHSX 235	PHSX 234	1st
CSCI 1XX	112 - Programming with C I, or 135 - Fund. Of CS I		3	2	3	M 151		1st, 2nd
ECNS 2XX	201 - Micro Econ, 202 - Macro Econ, 203 Micro/Macro Econ		3	3			Sophomore standing or COI	1st,2nd
			18	15	9			
Sophomore Spring								
EGEN 201	Engineering Mechanics - Statics		3	3			PHSX 234	1st,2nd
EELE 261	Intro to Logic Circuits		3	2	3		EELE 201, 202	2nd
M 274	Introduction to Differential Equations		3	3			M 273	1st,2nd
PHSX 237	General Physics - Electricity, Magnetism & Motion		3	3		M 274	M 273, PHSX 234, 235	1st,2nd
PHSX 238	General Physics - Electricity, Magnetism & Motion Lab		1		3	PHSX 237	PHSX 235	2nd
CSCI 255	Introduction to Embedded Systems		3	2	3		CSCI 112, 135, or COI	1st
			16	13	9			
Junior Fall								
EELE 203	Circuits II for Engineering		4	3	3	M 274	EELE 201, 202	1st
EGEN 202	Engineering Mechanics - Dynamics		3	3			EGEN 201, M 172	1st,2nd
M 333	Matrices & Linear Algebra		3	3			M 172	1st,2nd
EELE 355	Electric Machinery Fundamentals (*core)		3	2	3		EELE 201, EELE 202	1st,2nd
PHSX 423	Electricity & Magnetism I		3	3		see *em1	see *em2 note below	1st
EELE 394	Seminar		1	1			EELE 201 and EELE 261	1st
			17	15	6			
Junior Spring								
EELE 320	Process Instrumentation and Control		4	3	3		EELE 201, 202	1st,2nd
WRIT 321W	Advanced Technical Writing		3	3			see *atw note below	1st,2nd
EELE 317	Electronics (*core)		4	3	3		EELE 203	2nd
EELE 308	Signals and Systems Analysis (*core)		4	3	3		EELE 203	2nd
EELE 454	Power Systems Analysis		3	3			EELE 355	2nd
			18	15	9			
Senior Fall								
EELE 321	Intro to Feedback Controls (*core)		3	2	3		EELE 203, 320, or 308	1st
EELE 445	Telecommunications Systems (*core)		3	2	3		EELE 317, EELE 308	1st
STAT 332	Statistics for Sci. and Eng.		3	3			M 172	1st,2nd
EELE 488	Electrical Engineering Design I (*core)		2	1	3	EELE 321 or EELE 445	EELE 317	1st
BGEN 363	Business Ethics and Decision Making		3	3				
Prof. Elect.	Professional Elective (see *PrEl note below)		3	3				
			17	14	9			
Senior Spring								
EELE 489W	Electrical Engineering Design II (*core)		2	1	3		EELE 488W	2nd
EELE 486	Fundamentals of Engineering Exam for EE		1	1			EELE 321, 445	1st,2nd
EGEN 325	Engineering Economy Analysis		3	3			Junior standing	1st,2nd
Fund.Eng.Elect.	Fundamental Engineering Elective (see *FEElect note below)		3	3				1st,2nd
Prof. Elect.	Professional Elective (see *PrEl note below)		6	6				
			15	14	3			
	total credits for graduation		134					

*Free Elect.	Any 1xx course or higher
*math	Prerequisite: ACT above 27, or SAT above 610, or M 151 or equivalent
*humn/ss	see Catalog for list of approved HUMN and SS courses meeting the general ed requirement. EE requires 3 cr. of HUMN electives and 3 cr. of SS electives in addition to ECNS 2xx and BGEN363, which are required.
*PrEl	Professional Electives are restricted to EELE 400 level or higher excluding EELE 498
*FEElect	Choose any one of the following: EMEC 320 Thermodynamics; EGEN 324 Applied Thermodynamics; EGEN 335 Fluid Mechanics
*em1	Corequisite: EELE 203 or M 405 or PHSX 453 or consent of instructor
*em2	Prerequiste: M 274, PHSX 237, PHSX 238

WORK SHEET WITH PROPOSED CHANGES HIGHLIGHTED

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ■ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program

- ☐ Request to Plan (RTP)
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program

- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11

- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit

- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date 04/01/2021
Dept. Biology **College** CLSPS
Program B.A.S. - Biology **CRC Representative** _____

Description of Request: _____

Make available more options for students to complete their general education requirements, as well as add another "track" to the program with healthcare related courses intended for students with an AAS in a healthcare related field to earn their BAS with related courses.

Current Course or Program Information: _____

BAS Biology is already available to students, this will offer another track option; and the general education requirements will be more in alignment with current requirements.

Number (Assigned By CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req.
See Attached Documents			

This should include what will appear in the catalog, exactly. **New course require course outcomes listed in this area.**

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

Students completing their AAS in healthcare related fields through Highlands College have requested an option that feels more appropriate as an extender to their degree - this will make the Biology, B.A.S. an even more relevant option.

Anticipated Impacts to "Other" Programs

Anticipate only a few students per year taking advantage of this track to start - the courses are already offered as a part of other programs and should not take away from the offerings for current students in those programs.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): AY 2021 - 2022

APPROVALS

Department Head Approval Amy Kremi
Date 3/31/21

Dean Approval
Date _____

Graduate Council Approval
Date _____

Theresa Stack
CRC Approval
Date 4/12/2021

Faculty Senate Approval
Date _____

VCAA Approval (see below)
Date _____

Chancellor Approval (see below)
Date _____

Biology, B.A.S.

ADDITIONS DELETIONS

Block Transfer from A.A.S. – 38 credits

General Education Core

- WRIT 101 or WRIT 121 — 3 credits
- Hum & Fine Arts Elective — 3 credits
- Hum & Fine Arts Elective (UPP Div.) — 3 credits
- Social Science Elective (UPP Div.) — 3 credits
- Social Science Elective — 3 credits
- M 121 or M 140 — 3 credits
- STAT 216 — 3 credits
- CHMY 141 or BIOH 201 — 3 credits
- CHMY 142 or BIOH 202 — 1 credit
- CHMY 143 or BIOH 211 — 3 credits
- CHMY 144 or BIOH 212 — 1 credit
- WRIT 321 or 322 or 201 — 3 credits
    - TOTAL — 32 credits

Required Biology Courses

- BIOB 160 – Principles of Living Systems — 3 credits
- BIOB 161 – Principles of Living Systems Lab — 1 credit
- BIOM 260 – General Microbiology — 4 credits
    - Or BIOM 250/251 Microbiology for Health Sciences
- BIOB 375 – General Genetics — 3 credits
- BIOE 455 – Plant Ecology — 4 credits
- BIOE 314 – Animal Ecology — 4 credits
- BIOB 420 – Evolution — 3 credits
- BIOB 494 – Senior Seminar — 1 credit
- BIOB 499 – Senior Thesis — 1- 4 credits (3 required)
    - TOTAL — 26 credits

Other Required courses

- CAPP 131 or CAPP 156 or CAPP 158 — 3 credits
- COMX 111 or COMX 211 — 3 credits
    - TOTAL — 6 credits

Minimum Credits for a B.A.S. in Biology: 120

BAS OPTIONS (Choose 1 Track)

Track One (24 credits)

- CHMY 321 - Organic Chemistry I — 3 credits
- CHMY 323 - Organic Chemistry II — 3 credits
- CHMY 322 - Organic Chemistry Lab I — 1 credit
- CHMY 324 - Organic Chemistry Lab II — 1 credit
- BCH 480 - Advanced Biochemistry I — 3 credits
- Elective – UPPER Division — 3 credits
- Elective – UPPER Division — 2 credits
- Elective — 3 credits
- Elective — 3 credits

Track Two (24 credits)

- CHMY 210 - Survey of Organic Chemistry — 3 credits
- BIOB 425 - Advanced Cell & Molecular Biology — 3 credits
- BIOB 410 - Immunology — 3 credits
- Elective – UPPER Division — 3 credits
- Elective – UPPER Division — 3 credits
- Elective – UPPER Division — 1 credit
- Elective — 3 credits
- Elective — 3 credits

Track Three (24 credits)

- CHMY 210 - Survey of Organic Chemistry 3 credits
- Elective – UPPER Division 4 credits
- Elective – UPPER Division 4 credits
- Elective – UPPER Division 3 credits
- BIOO 320 - General Botany 4 credits
  -OR- BIOO 380 – Zoology
- Elective 3 credits
- Elective 3 credits

Track Four - Health Track (25 credits)

- BGEN 105 – Introduction to Business 3 credits
- ECP 120 – Emergency Medical Responder 3 credits
- ECNS 201 – Principles of Microeconomics 3 credits
- OSH 224 – Safety & Health Occupations & Programs 3 credits
- HIT 265 – Electronic Health Record in Medical Practice 3 credits
- KIN 322 – Kinesiology 4 credits
- BMGT 335 – Management & Organization 3 credits
- OSH 454 – Ergonomics 3 credits
- KIN 460 – ECG Assessment 3 credits

Course Descriptions – Biology, B.A.S. – Track Four

BGEN 105 - Introduction To Business

3 credits (Hrs: 3 Lec.)

An introductory course that surveys the nature of business, its functions, as well as its various environments and challenges. Topics covered include basic concepts in the areas of finance, management, ethics, accounting, and marketing. Non-business majors are encouraged to enroll in this course.

Course generally offered both semesters.

ECP 120 - Emergency Medical Responder

3 credits (Hrs: 3 Lec.)

Covers techniques in handling accidents and sudden illnesses and develops safety consciousness and civic responsibility. Basic First Aid materials are reviewed and advanced techniques are taught. Course is taught by a certified Instructor and students completing the course will receive a Certificate recognized by the National Safety Council using the American Heart Standards.

Course generally offered both semesters.

ECNS 201 - Principles of Microeconomics

3 credits (Hrs: 3 Lec.)

Covers traditional microeconomics topics including supply and demand and elasticity relationships, marginal analysis for equilibrium levels of outputs and inputs for firms in various industry sectors and international trade and finance.

Satisfies Social Science core. Course generally offered both semesters

OSH 224 - Safety and Health Occupations and Programs

3 credits (Hrs: 3 Lec.)

Examines the function of safety in industry, including the organization and application of safety programs. Methods of hazard analysis and accident prevention, correction and control are discussed and evaluated, as are accident investigation and analysis. Additionally, behavior modification, safety record keeping, motivation, workers compensation, professional ethics and disabled workers are addressed.

Course generally offered 1st semester

HIT 265 - Electronic Health Record in Medical Practice

3 credits (Hrs: 2 Lec., 1 Lab)

Students will learn the personnel functions and associated workflows required in an ambulatory care physician clinic and how to prepare for, implement and use an electronic health record (EHR) to achieve a paperless office environment and improved quality of care. Office function, associated workflow and EHR use will include all office personnel roles from receptionist through nurse and physician. EHR use will include both in-office functions and its role in Health Information Exchange (HIE) with other health care providers and organizations including laboratories, pharmacies, consulting physicians and payers.

Section 01 Classroom (Traditional), Section 2 Online (WWW)

KIN 322 - Kinesiology

4 credits (Hrs: 2 Lec., 3 Lab)

A functional study of musculoskeletal anatomy and its relationship to human movement giving consideration to both normal and pathological conditions.

Prerequisite(s): BIOH 301/302 & BIOH 311/312. Course generally offered 1st semester

BMGT 335W - Management and Organization

3 credits (Hrs: 3 Lec.)

A study of the basic principles and functions of management invoked in planning, organizing, influencing, and controlling a business organization.

Prerequisite(s): Junior standing or consent of instructor. *Satisfies upper division Writing core.* Course generally offered both semesters

OSH 454 - Ergonomics

3 credits (Hrs: 3 Lec.)

Provides the basic understanding of ergonomic considerations necessary to design tools, workstations, facilities, and systems to match human capabilities and limitations. Particular emphasis will be placed on analysis and reduction of upper extremities cumulative trauma disorders and hazards associated with manual material handling.

Prerequisite(s): Recommended Preparation BIOH 301/302 and BIOH 311/312. Course generally offered 1st semester

KIN 460 - ECG Assessment

3 credits (Hrs: 3 Lec.)

A study of 12-lead Electrocardiography including proper placement of electrodes, recognition and interpretation of arrhythmia, diagnostic and functional stress testing as related to the electrical activity of the heart.

Prerequisite(s): BIOH 301/302 & BIOH 311/312. Course generally offered 2nd semester

Course Outcomes – Biology B.A.S. – Track Four:

BGEN 105 3 credits

Introduction to Business

Learning Outcomes:

- Possess a basic working knowledge of each of the functional components of a contemporary business entity and of how the components work together to achieve business objectives;
- Possess a basic working knowledge of how a business entity interacts with customers, employees, vendors, and competitors;
- Possess an understanding of the economic, organizational, and political environments in which a business entity operates and how those environments influence its operations; and
- Possess a proficiency in the use of basic business terminology.

General Ed. Designators	H - Social Science / History
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

ECP 120 3 credits

Emergency Medical Responder

Learning Outcomes:

- Understand, describe and demonstrate the skills required of a first responder as required by the National Safety Council.
- Possess the knowledge, skills and abilities to carry out basic life support.
- Have developed the knowledge, skills and abilities to treat bleeding, shock, musculoskeletal and soft-tissue injuries to the level required of first responders.
- Develop an understanding of the relationship of the various components within the emergency medical services operation.
- Learn common modifications to first responder skills to improvise and adapt to special situations

General Ed. Designators	None
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

ECNS 201 3 credits

Principles of Microeconomics

Learning Outcomes:

Use FLOC outcomes

General Ed. Designators	H - Social Science / History
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

OSH 224 3 credits

Safety and Health Occupations and Programs

Learning Outcomes:
Students will learn the administration and programs of safety in industry, including the organization and application of safety programs.

Students will learn methods of hazard analysis and accident prevention, correction and control, accident investigation and analysis. Additionally, behavior modification, safety record keeping, motivation, workers' compensation, professional ethics and disabled workers are addressed.

General Ed. Designators	None
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

HIT 265 3 credits

Electronic Health Record in Medical Practice

Learning Outcomes:

- Identify the core functions/capabilities of an electronic health record (EHR), including clinical, administrative, financial, consumer, and business intelligence.
- Describe the major phases of work and activities associated with a successful EHR project, including analyzing business and clinical processes (e.g. process mapping, flow diagramming, gap analysis). Promote stakeholder understanding of IT opportunities and constraints.
- Differentiate the roles and responsibilities of health and health IT professionals and their associated workflows within the organizational structures in which they work. Ensure user access control according to established policies and procedures.
- Describe characteristics of technology infrastructure (e.g. network, communications, data integration, privacy and security) that support the EHR.
- Identify the primary sources for important standards and guidelines associated with health record systems. Describe roles of governmental, regulatory, professional, and accreditation agencies related to healthcare and their impact on clinical outcomes and financial performance
- Use EHR tools for customizing the EHR system; e.g. "templates" to improve and facilitate documentation.
- Use an EHR system to document patient intake information (e.g. vital signs), generate and document a prescription order and a patient referral, facilitate secure and confidential communication with a patient, generate a routine report from the patient database.
- Explain how the accuracy, completeness and currency of summary lists (e.g. problem, medication and allergy) is best maintained in the EHR.
- Differentiate "structured" and "free-text" data capture in the EHR as well as their impact on graphic display capabilities of the EHR system.
- Explain the benefits associated with a provider's use of customized "templates".
- Explain how an EHR system can address some of the root causes of medication errors.
- Explain how participation in research projects and registries, as well as requirements for external reporting impacts the use of an EHR system.
- Define the personal health record (PHR) and the continuity of care record (CCR).

General Ed. Designators	None
Integrated Lab	No
Online	Yes
Cultural Heritage of American Indians	No

KIN 322 4 credits

Kinesiology

Learning Outcomes:

- By the end of the semester the student will understand the interrelationship between the nervous, skeletal, and muscular systems
- By the end of the semester the student will be able to describe the components within the various diarthrodial joints in the body, the muscles and the movements allowed in the different anatomical planes
- By the end of the semester the student will be able to demonstrate the knowledge, skills, and abilities to perform movement analyses for the purpose of developing strength and conditioning programs for health and fitness, injury prevention and performance enhancement purposes

General Ed. Designators	None
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

BMGT 335 3 credits

Management and Organization

Learning Outcomes:

1. Define, explain and analyze the role of management in planning, leading, organizing and controlling organizations.
2. Explain, analyze and apply the organizing concepts of culture, decision-making to business and organizational settings.
3. Explain, analyze and apply the organizing concepts of structure, human resources, teams and change to business and organizational settings.
4. Explain, analyze and apply the leading and controlling concepts of organizational behavior, motivation, leadership, communication, and business ethics to team, business and organizational settings.

General Ed. Designators	None
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

OSH 454 3 credits

Ergonomics

Learning Outcomes:

Students will demonstrate an understanding of the fundamental aspects of ergonomics/human factors

Students will have experience applying the NIOSH guide for manual lifting tasks

General Ed. Designators	None
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

KIN 460 3 credits

ECG Assessment

Learning Outcomes:

- By the end of the course the student will be able to analyze a 12 lead EKG in a systematic and understandable format
- By the end of the course the student will have a solid base of fundamental electrocardiography knowledge that will serve them well for future learning
- By the end of the course the student will be able to describe the electrode placement for 12-lead EKG
- By the end of the course the student will be able to describe normal basic cardiac physiology
- By the end of the course the student will be able to describe what each part of the cardiac cycle represents, how it is seen on the EKG, and list the normal ranges for each component
- By the end of the course the student will be able to list the three basic laws of electrocardiography
- By the end of the course the student will be able to describe mean QRS Axis, and how to determine mean QRS Axis
- By the end of the course the student will be able to list what is seen in all leads in normal sinus rhythm in an apparently healthy individual
- By the end of the course the student will be able to describe, in theory, the EKG criteria for the following abnormalities: chamber enlargement/hypertrophy; bundle branch blocks/conduction defects; supraventricular arrhythmias; and ventricular arrhythmias

General Ed. Designators	None
Integrated Lab	No
Online	No
Cultural Heritage of American Indians	No

(Comp. Mech. (Capstone)

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - X Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form
   - ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
- ☐ Academic Proposal Request Form

☐ Other (for those that are considered in this level but otherwise not listed):

_____
- ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

☐ Re-titling an existing postsecondary educational program. Required Documents:
- ☐ Academic Proposal Request Form

☐ Terminating an existing postsecondary educational program.
- ☐ Academic Proposal Request Form
- ☐ Program Termination and Moratorium Form

☐ Consolidating existing postsecondary educational programs
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Establishing a new minor where there is a major or an option in a major
- ☐ Academic Proposal Request Form
- ☐ Curriculum Proposal Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Revising a postsecondary educational program
- ☐ Curriculum Proposal Form
- ☐ Academic Proposal Request Form

☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Other (for those that are considered in this level but otherwise not listed):

_____

☐ Academic Proposal Request Form

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or

academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum or Center/Institute Proposal
  - ☐ Completed Request to Plan, except when eliminating or consolidating
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program
- ☐ Curriculum Proposal
- ☐ Completed Intent to Plan Form

Date March 31, 2021
Dept. Business & Industry/Trades **College:** Highlands College
Program: Construction Mgmt./Precision Machining **CRC Representative:** Linda Granger

Description of Request: Remove a course and add another to the construction management AAS curriculum.

Current Course or Program Information: Construction Technology AAS degree

Number (Assigned By CRC): _____

Proposed Changes:

Course #	Name	Credits
Delete the following course from the AAS Program in Construction and Precision Machining		
CSTN 291	Special Projects	3 credits
MCH 291	Special Projects	3 credits
Add the following course to the AAS Programs in Construction and Precision Machining to replace the above-mentioned courses:		
CSTN 299	Capstone	3 credits
MCH 199	Capstone	3 credits

List of supporting documentation attached (See Level of Request for Requirements):

Not Applicable.

Assessment Leading to Request

A special projects course is supposed to run for a period of three years before it is converted into a class, and this course has been in the construction and precision machining curriculums since at least 2016.

Anticipated Impacts to "Other" Programs

None.

Impact on Library: No consultation is required since changes are only in the course number, course name, or course pre-requisites.

Date to take effect: When Approved.

APPROVALS

Department Head Approval Linda Granger

Date: March 31, 2021

Dean Approval _____

Date 4-7-2021

Graduate Council Approval _____

Date _____

Theresa Stack 4/12/2021

CRC Approval _____

Date _____

Faculty Senate Approval _____

Date _____

VCAA Approval (see below) _____

Date _____

Chancellor Approval (see below) _____

Date _____

CONSTRUCTION TECHNOLOGY AAS
CURRICULUM SHEET

COURSE NO.	TITLE	CREDITS	SEMESTER COMPLETED
	FIRST SEMESTER		
*CSTN 120	Carpentry Basics & Rough-In Framing	4	
*BGEN 235	Business Law	3	
WRIT 101 or WRIT 121	College Writing I or Intro. To Technical Writing	3	
M 105 (CAS or AAS Students) or	Contemporary Math	3	
M 121 (BAS Students)	College Algebra	3	
CAPP 131 or CAPP 156	Basic MS Office or MS Excel	3	
TOTAL CREDITS		16	
	SECOND SEMESTER		
**CSTN 142	Interior and Exterior Finish Carpentry	4	
**CSTN 160	Construction Concepts & Building Lab I	3	
**CSTN 250	Construction Estimating	3	
**CSTN 147	Blueprint Reading	3	
BGEN 105	Introduction to Business	3	
TOTAL CREDITS		16	
A student exiting program after second semester would be awarded a Certificate of Applied Science in Carpentry.			
	THIRD SEMESTER		
ACTG 201	Principles of Financial Accounting	3	
*CSTN 170	Site Layout	3	
*CSTN 201	Advanced Concrete Working	3	
*CSTN 161	Construction Concepts & Building Lab II	3	
*CSTN 271	Construction Project Management I	3	
TOTAL CREDITS		15	
	FOURTH SEMESTER		
**CSTN 260	Construction Concepts & Building Lab III	3	
**CSTN 281	Construction Project Management II	3	
**CSTN 251	Building Methods and Materials	3	
ECNS 201 or ECNS 203	Principles of Microeconomics **or** Principles of Microeconomics and Macroeconomics	3	
STAT 216 or STAT 131	Introduction to Statistics **or** Biostatistics	3	
CSTN 299	Capstone	3	
TOTAL CREDITS		18	
	TOTAL CREDITS FOR FOUR SEMESTERS	65	

*Fall Only
**Spring Only

PRECISION MACHINING AAS CURRICULUM SHEET			
COURSE NO.	**TITLE**	**CREDITS**	**SEMESTER COMPLETED**
	FIRST SEMESTER		
MCH 268	CNC Machining I	3	
MCH 120	Blueprint Reading & Interpretation for Machining	3	
MCH 160	Machine Shop I	3	
MCH 245	Shop Practices	3	
MCH 129	Machine Quality Control & Precision Measurements	3	
M 105 OR M 121	Contemporary Math OR College Algebra	3	
TOTAL CREDITS		**18**	
	SECOND SEMESTER		
MCH 260	Machine Shop II	3	
MCH 235	CNC Milling Programming & Operations Level I	3	
MCH 231	CNC Turning Operations Level I	3	
W 101 OR W 121	College Writing OR Introduction to Technical Writing	3	
MCH 130	Machine Shop Essentials	3	
TOTAL CREDITS		**15**	
A student exiting program after second semester would be awarded a Certificate of Applied Science in Machining Technology.			
	THIRD SEMESTER		
MCH 265	Advanced Machining & Manufacturing	3	
MCH 240	Metallurgy	3	
MCH 236	CNC Milling Programming & Operations Level II	3	
CAPP 131 OR CAPP 156	Basic MS Office or MS Excel	3	
***BGEN 235**	Business Law	3	
ECNS 201 or ECNS 203	Principles of Microeconomics OR Principles of Microeconomics and Macroeconomics	**3**	
TOTAL CREDITS		**18**	
	FOURTH SEMESTER		
BGEN 105	Introduction to Business	3	
MCH 227	Swiss CNC & Mill-Turn Systems	3	
MCH 232	CNC Turning Programming & Operations Level II	3	
MCH 199	Capstone	3	
ACTG 201	Principles of Financial Accounting	3	
STAT 216 or STAT 131	Introduction to Statistics **or** Biostatistics	3	
TOTAL CREDITS		**18**	
	TOTAL CREDITS FOR FOUR SEMESTERS	**69**	

Course Syllabus
CSTN 299 Capstone: Construction

Instructor: Rich Miller/Mike Fink
Office: Room 116A
Phone: 496-3724
E-mail: rmiller4@mtech.edu
Office Hours: By appointment

Class Credits: 3
Days and Time: To Be Announced
Location: Room 149
Prerequisites:

- CSTN120, CSTN 142, CSTN 160, CSTN161, CSTN250, CSTN271

Co-requisite:

- CSTN 281 – Project Management II

Contact Hours Per Semester: 45 hours +

COVID-19 Statement - Mask/Face Covering Policy

We know from existing data that wearing an appropriate face covering in public can help prevent the spread of COVID-19 in the community (Lyu & Wehby, 2020; CDC, 2020; Johns Hopkins Medicine, 2020). In accordance with policy from the Montana University System, Montana Technological University has determined that everyone will be required to wear a face covering in university buildings, classrooms. You **MUST** wear a face covering ap0propriately (i.e., covering both your mouth and nose) in the building when you are attending class in person. Face coverings have been provided for students, instructors, and staff, and everyone is expected to wear one while inside any university building.

Anyone attending class in person without a face covering will be asked to put one on or leave. Instructors have the option to end class if anyone present refuses to appropriately wear a face covering for the duration of class. Students who refuse to wear face coverings appropriately or adhere to other stated requirements may face disciplinary action for Code of Conduct violations. On a case-by-case basis, students may consult with the Dean of Students and/or Student Disability Resources.

Appropriate face coverings are those that cover the mouth and nose of the wearer. Following CDC guidance, effective face coverings include simple cloth masks, scarves, buffs, or bandanas. Based on CDC guidelines, the most effective face coverings should:

- fit snugly but comfortably against the side of the face;
- securely stay in place, covering the nose and mouth;
- include multiple layers of fabric;
- allow for breathing without restriction; and
- be able to be laundered and machine-dried without damaging them or changing their shape.

While not ideal, disposable, single use paper masks are also acceptable when another face covering option is not available. Unless in healthcare or other specialized settings, N95 or surgical masks should not be used as they are critical supplies and should be reserved for healthcare workers and other first responders.

While plastic face shields are not considered a face covering under the guidelines outlined above, face shields may be used in instances where an individual can consistently and reliable maintain appropriate social distancing and where the University has expressly approved the use of the face shield instead of a cloth mask. Such instances may include, but not be limited to, ADA and other medical accommodations. If an individual is approved to use a plastic face shield, the shield should cover from above the eyes to below the chin to reduce the risk of the spread of respiratory particles.

Course Objective:

Students will have the opportunity to complete a project that showcases the skills and knowledge gained throughout the entire program. Students will present this Capstone Project for final grade. Projects should be one of the following types:

Project management-Based: Student will provide a detailed management packet including estimate, schedule, monitoring plan, risk mitigation plan, etc. for a construction project. (residential or commercial). Notes and/or outline should be kept and included in final project presentation.

Project-Based: Project should be related to student's focus area and should be designed, developed, and created by the student. Careful notes and a journal should be kept and be included in final project presentation.

Community Service-Based: Student will identify a need in the community and work through the process of planning and executing a project to satisfy that need. A journal or project process notes should be kept and used in the final project presentation.

Syllabus subject to change at any time.

A *Montana Tech Student Handbook and Planner* can be found at this link:
https://www.mtech.edu/student-life/student-handbook.pdf.

As part of the syllabus review Absence from Classes (p. 15); Academic Dishonesty (p.15-16); and Grade and Appeal Policy (p. 20-21) will be discussed.

Disability Support Services:
Students with disabilities, whether physical, learning, or psychological, who believe that they may need accommodations in this class are encouraged to contact Tara Kloker at 406-496-3730 or 406-496-4218 as soon as possible to ensure that such accommodations are implemented in a timely manner.

*Fall Only

Montana Tech
Highlands College

COURSE SYLLABUS
For
Fall Semester – Precision Machining Technology
Capstone: Machinist 1
Face Masks Are Required At All Times!

Semester: Spring 2022 **Credits:** 3

Instructor: Mike McCormack & Tony Patrick
Office Hours: By Appointment

Office Phone: 496-3789 – Leave Message, Name and Number

Pre-requisites: MCH260, MCH235 & MCH231

Hours: T&R 10:00am – 11:30am

Location: Room 155 – Trades & Technical CAD Lab
& Room 148 Machine Shop

Books and Tools:
Mastercam 20 Online Training Guide
Precision Machining Technology
Machinery's Handbook – Pocket Companion
Machinists' – Ready Reference

Course Description:
This special project allows students to demonstrate their accumulated knowledge and abilities in precision machining by creating a complicated assembly. The project may be chosen from a provided list or it may be one of the student's choosing as long as it meets the minimum requirements and receives the instructor's approval.

Course Objectives:
- Student will design a special project.
- Project must be submitted to instructor for approval.
- Create a parts list and cost of parts
- Student will estimate time to create the CAD model, time to create CNC code and time to machine the project.
- Student will determine if the project should be manual made or made on the CNC machine or both.
- Student will produce the project using manual machines and/or CNC machines.
- Students will prepare a paper on the finished project. To include CAD drawings, parts list and all costs incurred to make the project.

Class Requirements:
Face Mask :
We know from existing data that wearing an appropriate face covering* in public can help prevent the spread of COVID-19 in the community (Lyu & Wehby, 2020; CDC, 2020; Johns Hopkins Medicine, 2020). In accordance with policy from the Montana University System, Montana Technological University has determined that everyone will be required to wear a face covering in university buildings, including classrooms. You MUST wear a face covering appropriately (i.e., covering both your mouth and nose) in the building when you are attending class in person. Face coverings have been provided for students, instructors, and staff, and everyone is expected to wear one while inside any university building.
Anyone attending class in person without a face covering will be asked to put one on or leave. Instructors will have the option to end class if anyone present refuses to appropriately wear a face covering for the duration of class. Students who refuse to wear face coverings appropriately or adhere to other stated requirements may face disciplinary action for

Code of Conduct violations. On a case-by-case basis, students may consult with the Dean of Students and/or Student Disability Resources.

Appropriate face coverings are those that cover the mouth and nose of the wearer. Following CDC guidance, effective face coverings include simple cloth masks, scarves, buffs, or bandanas.

Based on CDC guidance, the most effective face coverings should:

- fit snugly but comfortably against the side of the face;
- securely stay in place, covering the nose and mouth;
- include multiple layers of fabric;
- allow for breathing without restriction; and
- be able to be laundered and machine-dried without damaging them or changing their shape.

While not ideal, disposable, single use paper masks are also acceptable when another face covering option is not available. Unless in healthcare or other specialized settings, N95 or surgical masks should not be used as they are critical supplies and should be reserved for healthcare workers and other first responders.

While plastic face shields are not considered a face covering under the guidelines outlined above, face shields may be used in instances where an individual can consistently and reliably maintain appropriate social distancing and where the University has expressly approved the use of the face shield instead of a cloth mask. Such instances may include, but not be limited to, ADA and other medical accommodations. If an individual is approved to use a plastic face shield, the shield should cover from above the eyes to below the chin to reduce the risk of the spread of respiratory particles.

Perform the assignment that are given. Most of the material introduced in this class will likely be new to you therefore attendance is required and expected. Absenteeism is a leading cause of job loss and college failure. That said, attendance is important, and poor attendance will result in lower grades. The classes in the Precision Machining Technology program are dependent on your participation during both lab and classroom time. Without explanation, some of the material may be very difficult for you to understand. Class time will also be of value in providing you with an opportunity to ask questions. **Keep in mind that class lectures will not be repeated for anyone regardless of the reason for absence**. If you miss class you are still responsible for any material discussed.

Class attendance and participation required.

You will be graded daily and any time you come in late or leave early you earn ½ of a day. Every 2 times you are late or leave early is equal to one absence. After 4 absences or equivalent during one semester, a student will be deemed a safety hazard, which will result in being removed from the program. If you do not call in or email, no assignment or test can be made up for that day(s).

Absences will reduce final grade. Example: we meet 10 times during term. A student misses 2 classes. The student will have an 80% attendance. This will be averaged with the sum of all the other grades. If the student gets 70% for other graded work and an 80% attendance, the final grade would be a 75%.
Six (6) absences will result in a one letter grade drop (A to a B, B to a C, etc.)

Classroom Civility:

Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, or demeaning. The instructor has primary responsibility for and control over classroom behavior and maintenance of academic integrity. Some ways to maintain classroom civility follow below.

Instructor's responsibilities to help maintain classroom civility:

Start and end class on time.
Treat all students with courtesy and respect.
Be open to constructive input from students in the course.
Ensure that opportunities to participate are enjoyed by all students in the course.

Student's responsibilities to help maintain classroom civility:

Come to class on time and refrain from packing up belongings before class ends.
Turn off all electronic devices that might create a disruption in class.
Be quiet and give full respectful attention while either instructor or another student is speaking. When speaking, use courteous, respectful language and keep comments and questions relevant to the topic at hand.

Horse play, vulgar language and outbursts in class will not be tolerated at any time. Repeated violations may subject you to being asked to leave the class and return when you can act responsibly. If you do not or will not comply you may be asked to withdraw from the program.

Cell Phones and other electronic devices:
Use of cell phones and other electronic devices will not be allowed during class period. *All Cell Phones will be collected before class and returned at end of day.*

THE USE OF DRUGS AND ALCOHOL

Highlands College is a drug-free and tobacco free campus, meaning that the use or selling of any illegal drugs on campus (even if you have a medical marijuana card) is prohibited. Being under the influence of illegal drugs as well as some legal ones can pose a serious risk to the safety of everyone in a machining lab. If drug use is suspected that student will be asked to leave for that day in order to maintain a safe environment. The student will be referred to the Assistant Dean of Student Services for this infraction of the Student Code of Conduct (found in the Student Handbook) and possibly be dismissed from the machining program because of the threat to the safety of others. The use of any tobacco product (including cigarettes, smokeless tobacco and e – cigarettes and all forms of vapor products) is not permitted on campus.

PLAGIARISM AND ACADEMIC INTEGRITY

300.14 ACADEMIC HONESTY

The integrity of the academic process requires credit be given where credit is due. Accordingly, it is academic misconduct to present the ideas or works of another as one's own work, or to permit another to present one's work without customary and proper acknowledgment of authorship. Students may collaborate with other students only as expressly permitted by the instructor. Students are responsible for the honest completion and representation of their work, the appropriate citation of sources and the respect and recognition of others' academic endeavors.

300.42 DESCRIPTIONS AND EXAMPLES

D. Plagiarism

This is presenting the work of another as one's own without proper acknowledgment.

Examples of plagiarism include submitting as one's own work the work of another student, ghost writer or commercial writing service; directly quoting from a source without acknowledgment; paraphrasing or summarizing another's work without acknowledging the source; or using facts, figures, graphs, charts or information without acknowledging the source. Plagiarism may occur orally or in writing and may involve computer programs and files, research designs, distinctive figures of speech, ideas and images or any other information that belongs to another person and is not acknowledged as such. Inadvertent or unintentional misuse or appropriation of another's work (such as relying heavily on source material that is not expressly acknowledged) is still considered plagiarism.

Please see the link below for more information and the entire policy. http://www.msugf.edu/about/PoliciesProcedures/300/300_STUDENT_CONDUCT_AND_GRIEVANCE_002.pdf

Anyone caught cheating will be awarded a zero for that assignment or task up to dismissal from the program.

Exams and Assignments:

Class Assignments (with due dates)
Projects (instructor assigned)
Attendance
Midterm Exam
Final Exam

Grading Scale:

A - 100 to 90
B - 89 to 80
C - 79 to 70
D - 69 to 60
F - 59 and below
Scores below 70 must schedule meeting with instructor.

Syllabus is subject to change without notice.

Curriculum Change Request Form Dated Jan 24, 2021

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval. **Directions found at the end of the document and can be delated before forwarding to the CRC. Complete sections**

Please indicate the type of request(s) by selecting *all that apply*:

- ☐ ***Faculty Approvals*** *(directly to CRC, then Faculty Senate):*
- ☐ ***Campus Approvals Level I*** *(must be approved by the VCAA prior to CRC submission):*
- ☐ ***OCHE Approvals Level I*** *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
- ☐ ***OCHE Approvals Level II*** Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

1. Date 4/12/2021

2. Department Geological Engineering

3. B.S. Geological Engineering Option changes

4. Program: BS Geological Engineering

5. CRC Rep. Glenn Shaw

6. Description of Request: Modify B.S. Geological Engineering Option Courses

7. Current Course or Program Information: BS Geological Engineering

8. Proposed Change **As appearing in the catalogue. A new course requires the course outcomes listed in this area.**

All Students majoring in Geological Engineering, B.S. must meet the general core requirements of Montana Tech. Students must select one of the following options in Geological Engineering no later than the Spring Semester of their Junior Year. Students who do not select one of the approved elective sequences must design one that meets their educational objectives and have it approved by their Faculty Advisor and Department Head no later than the Spring Semester of their Junior Year. Courses listed are considered "GEOE and technical electives" and satisfy the majority of their designated credits in the B.S. program of study. Geotechnical Option GEOE 541 - Advanced Engineering Geology 3 credits GEOE 542 - Slope Stability Analysis & Design 3 credits ECIV 486 - Soil Mechanics & Foundation Design 3 credits MIN 5200 - Finite Element Method in Geomechanics 3 credits GEOE 406 - Geomorphology-Photogeology 3 credits	**Course # Name** **Credits Pre-req.** Degree Option Requirements All Students majoring in Geological Engineering, B.S. must meet the general core requirements of Montana Tech. Students ~~must~~should select one of the following options in Geological Engineering no later than the Spring Semester of their Junior Year. Students who do not select one of the approved elective sequences must design one that meets their educational objectives and have it approved by their Faculty Advisor and Department Head no later than the Spring Semester of their Junior Year. Courses listed are considered "GEOE and technical electives" and satisfy the majority of their designated credits in the B.S. program of study. Geotechnical Option GEOE 541 - Advanced Engineering Geology 3 credits GEOE 542 - Slope Stability Analysis & Design 3 credits ~~ECIV 486 - Soil Mechanics & Foundation Design 3 credits~~ ~~MIN 5200 - Finite Element Method in Geomechanics 3 credits~~ GEOE 548 – Geotechnical Modeling 3 credits

Hydrogeology Option GEOE 422 - Groundwater Flow Modeling 3 credits GEOE 429 - Field Hydrogeology 1-4 credits Choose two of the following 3-credit courses for a total of 11 credits in the option: GEOE 528 Contaminant Transport, GEOE 520 Advanced Hydrogeology, GEOE 533 Hydro-geochemistry, and EENV 402 Surface Water Hydrology. Mining Option MIN 215 - Mining Methods 3 credits EMET 232 - Process Engineering Fundamentals 2 credits EMET 234 - Process Engineering Fundamentals Lab 1 credit MIN 310 - Computer Aided Mine Design 1 credit GEOE 411 - Metallic Ore Deposits 3 credits MIN 408 - Valuation of Mineral Properties 3 credits MIN 418 - Ore Reserve Estimation 3 credits Petroleum Option PET 201 - Elements of Petroleum Engineering 3 credits PET 205 - Petroleum Engineering Lab I 1 credit PET 301 - Introduction to Well Drilling 3 credits PET 304 - Rock Properties 3 credits PET 348 - Petroleum Well Logging 3 credits GEOE 357 - Subsurface Methods in Petroleum Geology 3 credits	Students in the Geotech Option are encouraged to take courses from the following list to fill additional GEOE Tech electives for a total of 15 credits • GEOE 406 - Geomorphology-Photogeology 3 credits • GEOE 585 – GIS of Natural Resources • MIN 475/575 – Tunneling • Any appropriate GEOE 591 – Special Topics course related to geotechnical engineering designated with “GT” in the title Students choosing the Geotechnical Option are encouraged to take GEOE 449 – Field Geotechnical Engineering 1-4 credits as part of the required field camp modules. Hydrogeology Option GEOE 422 - Groundwater Flow Modeling 3 credits ~~GEOE 429 - Field Hydrogeology 1-4 credits~~ EENV 402 – Surface Water Hydrology 3 credits Choose one of the following 3-credit courses: • GEOE 520 Advanced Hydrogeology • GEOE 528 Contaminant Transport • GEOE 533 Hydro-geochemistry • CHMY ### Environmental Chemistry Choose one of the following 3-credit courses: • GEOP 420 Hydrogeophysics • GEOP 425 Remote Sensing • GEOE 585 GIS of Natural Resources Students in the Hydrogeology Option are required to take GEOE 429 Field Hydrogeology 1-4 credits as part of their required field camp modules. Mining Option MIN 215 - Mining Methods 3 credits EMET 232 - Process Engineering Fundamentals 2 credits EMET 234 - Process Engineering Fundamentals Lab 1 credit MIN 310 - Computer Aided Mine Design 1 credit ~~GEOE 411 - Metallic Ore Deposits 3 credits~~

	GEOE 531 – Acid Rock Drainage 3 credits MIN 408 - Valuation of Mineral Properties 3 credits MIN 418 - Ore Reserve Estimation 3 credits Petroleum Option PET 201 - Elements of Petroleum Engineering 3 credits PET 205 - Petroleum Engineering Lab I 1 credit PET 301 - Introduction to Well Drilling 3 credits PET 304 - Rock Properties 3 credits PET 348 - Petroleum Well Logging 3 credits ~~GEOE 357 – Subsurface Methods in Petroleum Geology 3 credits~~

9. Assessment Leading to Request: General Curriculum:

1) This change fills option requirements from some courses being removed, rarely taught, or moved to the B.S. Geological Engineering core curriculum. The Hydrogeology and Geotechnical Engineering options allow more flexibility in courses that students can choose from.

10. List of supporting documentation attached: None. No new courses are being requested. All curriculum sheets are not included because all of the option courses fall within the existing professional and technical elective noted in the curriculum sheet. .

11. Impacts:

X No impact to Library or

☐ _____consulted with _____from the library to ensure needed materials and media are available

☐ No anticipated impact to other programs or

X__ GShaw____consulted with __K. Ganesan & S Rosenthal_from _Env. Eng_____and discussed possible increased enrollment in some of their courses.

APPROVALS	**Date and Signature**
Department Head	
Glenn Shaw	4/12/21 
Dean Approval	
Email from Dan T with approval	
Graduate Council	
CRC 	**4/13/2021**
Faculty Senate	

Campus Approvals Level I *(must be approved by the VCAA <u>prior</u> to CRC submission):*
OCHE Approvals Level I & II *(must be approved by the VCAA and Chancellor prior to CRC submission)*

VCAA Approval	
Chancellor Approval	

Curriculum Change Request Form Dated Jan 24, 2021

Guidance: Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)

Level of Request Requirements

Please indicate the type of request(s) by selecting *all that apply*:

1. ***Faculty Approvals*** *(directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
     or
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Course Number
     - ☐ Course Description
     - ☐ Syllabus with Course Outcomes
     - ☐ Pre-requisites or co-requisites
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor.
     - ☐ **Documents as listed under establishing a new course**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):
2. ***Campus Approvals Level I*** *(must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium.
     - ☐ Academic Proposal Request Form
   - ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more.
     or
   - ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
     - ☐ Academic Proposal Request Form
     - ☐ **Documents as listed under establishing a new course**
   - ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
     - ☐ Academic Proposal Request Form
   - ☐ Other (for those that are considered in this level but otherwise not listed):
     - ☐ Academic Proposal Request Form
3. ***OCHE Approvals Level I*** *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link: https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  or
- ☐ Establishing a new minor where there is a major or an option in a major

or

- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
- ☐ Other (for those that are considered in this level but otherwise not listed):

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ☐ Establishing a new postsecondary educational program

  or
- ☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form
  - ☐ Documents as listed under establishing a new course
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course**
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum or Center/Institute Proposal
  - ☐ Completed Request to Plan, except when eliminating or consolidating
  - ☐ **Documents as listed under establishing a new course**
- ☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program
  - ☐ Curriculum Proposal
  - ☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - ✓ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Other (for those that are considered in this level but otherwise not listed):

  _____
  - ☐ Academic Proposal Request Form

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  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
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  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

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- ☐ Academic Proposal Request Form

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  - ☐ Curriculum Proposal
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MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date ___4/1/21_____
Dept. _Geological Engineering_____ **College**_School of Mines & Engineering___
Program BS_____ **CRC Representative** __G.Shaw_____

Description of Request: __Slight adjustment of title for GeoE 449 Field Geotechnical Engineering___
No changes are proposed to the catalog. The course title can be adjusted by enrollment services when needed.

Current Course or Program Information:
The course description indicates that the course may (or may not) contain projects involving drones, or UAS (unmanned aerial systems) technologies, depending on the year and who is teaching the course. To support the proposed UAS (drone) certificates, we would like to make it clear in the course title whether the content includes UAS technologies or not. We can't use a different course number as the content would be more than 80% the same.

Number (Assigned By CRC): _____
Proposed Change

Course #	**Name**	**Credits**	**Pre-req.**
GeoE 449	**Field Geotechnical Engineering**	**1-4**	**GeoE 440, ECiv 486, or instructor consent**

Catalog description:
Provides 1-4 weeks of intensive experience with field methods of geotechnical engineering, focused on characterization of engineering sites underlain by soil and/or rock. The course will involve hands-on experience with site investigation techniques for soil and/or rock sites aligned with the expertise of the department faculty and availability of appropriate sites. Examples of topics covered may include geotechnical drilling and sampling, underground rock mass mapping and stability analysis, and UAV-based imagery collection, interpretation, and analysis. Field and laboratory characterization of geological materials will be integrated with the site investigations, in conjunction with one or more engineering design projects, A fee for supplies, transportation, and other logistical expenses is required.

Prerequisite(s): GeoE 440, or ECiv 486, or Consent of Instructor. Course generally offered during summer session, every other year or on demand.

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

See list of course outcomes on attached syllabus

The only proposed change is that when at least one project is included that involves the use of UAS technologies, the title will be "Field Geotechnical Engineering (w/UAS)"

List of supporting documentation attached (See Level of Request for Requirements):
Syllabus.

Assessment Leading to Request
Identifying UAS content may be important to the new UAS certificate programs. The registrar suggested that the title can be adjusted when the course contains UAS content.

Anticipated Impacts to "Other" Programs
None

Impact on Library: No consultation is required since changes are only in the course number, course name, or course pre-requisites.

Date to take effect: _5/1/2021_____

APPROVALS

Department Head Approval ___ _____
Date _4/12/2021_____

Dean Approval **Email from DanT, approved_____ Date ___**

Graduate Council Approval _____
Date _____

CRC Approval

_____ Date 4/13/2021_____

Faculty Senate Approval _____
Date _____

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

Curriculum Change Request Form Dated August 15, 2020

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.
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https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

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☐ Naming Convention as determined by CRC

LEVEL of Request
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✠ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:

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- ☐ Course Outcomes
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- ☐ Existing Curriculum Worksheet
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☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:

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EFLE 554

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date	March 1, 2021	College	SME
Dept	Elec. Eng.	CRC Representative	
Program	Elec. Eng.		

Description of Request: **Add pre-req to EELE 554**

Current Course or Program Information: EELE 5540 - Power System Operation and Control; 3 credits (Hrs: 3 Lec.); An introduction to power system operations and control, including the study of load-frequency control, control of reactive resources, economic dispatch, locational marginal pricing and integration of renewable resources. Power system stability is also introduced. Prerequisite(s): EELE 454. Course offered on demand.

Number (Assigned by CRC): _____

Proposed Change

Course #	Name	Credits	Pre-req
EELE 5540	Power System Operation and Control	3 credits (Hrs: 3 Lec.)	Prerequisite(s): EELE 454 and EELE 203. Course offered on demand.
An introduction to power system operations and control, including the study of load-frequency control, control of reactive resources, economic dispatch, locational marginal pricing and integration of renewable resources. Power system stability is also introduced.			

List of Supporting Documentation:

1. Syllabus is attached.

Assessment Leading to Request: Course requires knowledge of dynamic systems. Instructor became aware of a pathway to the course wherein students could meet the existing pre-req without any knowledge of dynamic systems. Students normally take EELE 203 in their junior year. Faculty discussed the issue, and concluded that adding this pre-req prevents unprepared students from enrolling in the course without a detrimental impact on students who wish to take the course as either a professional elective or as part of their grad curriculum.

Anticipated Impacts to Other Programs: None

Anticipated Impact to Support Services (e.g. Facilities, OSP, Bookstore, Library): None

Due to Take Effect: August 15, 2021

Approvals

Title	Signature	Date
Department Head		3/8/2021
Dean	Dan Trudnowski	3/16/2021
Graduate Council		4/14/2021
CRC		
Faculty Senate		
VCAA		4/14/21
Chancellor		

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

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See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
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- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Protocol: The department requesting a curriculum change holds a discussion at the departmental level, and if agreed upon, the Department Chair, elevates the request to the Dean for approval. All changes to the catalog require CRC approval.

Final changes are made by the registrar after faculty senate approval and BOR approval, as needed.
See workflow document
https://helpx.adobe.com/acrobat/how-to/convert-word-excel-paper-pdf-forms.html?set=acrobat--fundamentals--pdf-forms
Guidance can be found at: https://mus.edu/che/arsa/academicproposals.html

Submission Requirements: All Submissions (checked by CRC):

- ☐ Electronic Copy (with the exception of signatures- no handwritten items)
- ☐ Completed CRC Form, with all Signatures and Attachments based on level of request (see below)
- ☐ Naming Convention as determined by CRC

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   - ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information) Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Curriculum Worksheet
     - ☐ Pre-requisite or co-requisite
   - ☐ Course Changes: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing. Required Documents:
     - ☐ Course Number
     - ☐ Course Outcomes
     - ☐ Course Description
     - ☐ Syllabus
     - ☐ Pre-requisites or co-requisites
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
     - ☐ **Documents as listed under establishing a new course (as applicable)**
     - ☐ Existing Curriculum Worksheet
     - ☐ New Curriculum Worksheet, with changes highlighted
   - ☐ Other (for those that are considered in this level but otherwise not listed):

     _____

2. *Campus Approvals Level I (must be approved by the VCAA prior to CRC submission):*
   - ☐ Placing a postsecondary educational program into moratorium: Required Documents:
     - ☐ Program Termination and Moratorium Form
     - ☐ Academic Proposal Request Form
   - ☐ Withdrawing a postsecondary educational program from moratorium. Required Documents:
     - ☐ Academic Proposal Request Form

- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a B.A.S./A.A./A.S. area of study. Required Documents:
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Offering an existing postsecondary educational program via distance or online delivery. Required Documents:
  - ☐ Academic Proposal Request Form

3. OCHE Approvals Level I *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level I items are those requests for which the Board of Regents has fully designated approval authority to the institution or Commissioner of Higher Education. These requests are to be submitted for notification to or approval by Commissioner as Level I proposals. Level I proposals may be submitted to OCHE at any time by the flagship campuses or community colleges and will be processed on a rolling monthly schedule. The approval of such proposals will be conveyed to the Board of Regents at the next meeting of the board. Level I proposals include campus initiatives typically characterized by minimal costs, clear adherence to approved campus mission, and the absence of significant programmatic impact on other institutions within the MUS and community colleges. BOR Forms can be found using the following link:
https://mus.edu/che/arsa/Forms/AcademicForms.html

- ☐ Re-titling an existing postsecondary educational program. Required Documents:
  - ☐ Academic Proposal Request Form
- ☐ Terminating an existing postsecondary educational program.
  - ☐ Academic Proposal Request Form
  - ☐ Program Termination and Moratorium Form
- ☐ Consolidating existing postsecondary educational programs
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Establishing a new minor where there is a major or an option in a major
  - ☐ Academic Proposal Request Form
  - ☐ Curriculum Proposal Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**
- ☐ Revising a postsecondary educational program
  - ☐ Curriculum Proposal Form
  - ☐ Academic Proposal Request Form
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
  - ☐ Academic Proposal Request Form
  - ☐ **Documents as listed under establishing a new course (see section 1)**

4. Level II *(must be approved by the VCAA and Chancellor prior to CRC submission)*:
Level II proposals require initial approval and comment by the Board of Regents through a Request to Plan prior to final review and approval by the Office of the Commissioner of Higher Education. These proposals entail more substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination or personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other MUS institutions and community colleges.

- ■ Establishing a new postsecondary educational program

- ■ Request to Plan (RTP)
- ■ Academic Proposal Request Form
- ■ Curriculum Proposal
- ■ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ■ **Documents as listed under establishing a new course (see section 1)**

☐ Permanent authorization for a temporary C.A.S. or A.A.S degree program

- ☐ Academic Proposal Request Form
- ☐ C.A.S/A.A.S Curriculum Proposal
- ☐ Fiscal Analysis Form
- ☐ Completed Intent to Plan Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11

- ☐ Academic Proposal Request Form
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Forming, eliminating or consolidating an academic, administrative, or research unit

- ☐ Academic Proposal Request Form
- ☐ Curriculum or Center/Institute Proposal
- ☐ Completed Request to Plan, except when eliminating or consolidating
- ☐ **Documents as listed under establishing a new course (see section 1)**

☐ Re-titling an academic, administrative, or research unit Permanent authorization for a temporary C.A.S. or A.A.S degree program

☐ Curriculum Proposal

☐ Completed Intent to Plan Form

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

Date 11/2/2020
Dept. _____ **College** Highlands College
Program _____ **CRC Representative** Linda Granger

Description of Request: _____

Create a 30 credit General Studies Certificate demonstrating completion of the Montana Technological University MUS Core should students transfer within the MUS.

Current Course or Program Information: _____

The certificate is currently not available at Montana Tech or Highlands College.

Number (Assigned By CRC): _____
Proposed Change

Course #	Name	Credits	Pre-req.
M 1xx OR 2xx or STAT 131 or 216	Mathematics Core	6	
P & L Sci 1xx or 2xx	Physical & Life Sciences w/ Lab	6/7	
HUMN 1xx or 2xx	Humanities Electives	6	
SS 1xx or 2xx	Social Science Electives	6	
WRIT 101 WRIT 121	College Writing I OR Intro to Technical Writing	3	
COMX 111 COMX 230 WRIT 201	Intro to Public Speaking OR Presenting Technical Info OR College Writing II	3	
	Total Credits for Certificate	30/31	

This should include what will appear in the catalog, exactly. New course require course outcomes listed in this area.

List of supporting documentation attached (See Level of Request for Requirements):

Assessment Leading to Request

The Certificate of General Studies serves to fulfill the requirements of the MUS Core recognizing student may want to complete their generals through Highlands College/Montana Tech before transferring to another institution within the MUS. Providing the certificate demonstrates successful completion of the MUS core creating a smoother transition for students post-transfer and delivers a stackable credential in one year for those students who may want to earn the Associate of Science at Highlands College prior to enrolling in their four-year BS program at Montana Tech or another institution within the MUS. Although this would be open to all current and future students of Montana Tech and Highlands College, the General Studies Certificate was identified as important to several area high schools who want to work with Tech to provide a robust Dual Enrollment program and as such would be emphasized in the high schools when working with the students, instructors and counselors.

Anticipated Impacts to "Other" Programs

Enrollment numbers could decrease in the 100-200 level high demand courses for Freshmen if more students take the courses through Montana Tech's Dual Enrollment Program. Those students would then start in program specific and higher level coursework having completed their 100 and possibly some of their 200-level general education courses and would come to Tech as Sophomores with 30 credits completed. In addition, it streamlines Dual Credit so students are not taking courses that will not count towards their four-year programs.

Karen Vandaveer and Michelle Morley met with Janet Friesz, Montana Tech Registrar and Shauna Savage, Director of Financial Aid to discuss fees and issues with Financial Aid. Students will need to pay the $79 graduation fee in order to receive the certificate and there should not be significant impact to financial aid because the students applying for the degree are most likely going to be Dual Enrollment Students who are not yet able to use financial aid.

Impact on Library: Michelle Morley has consulted with Scott Juskiewicz at the Montana Tech library to ensure needed materials and media are available. (Or No consultation is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect (note that the earliest date is the next calendar year): Fall 2021

MontanaTech *Curriculum Change Request Form Dated August 15, 2020*

APPROVALS

Department Head Approval _____
Date 2/10/21

Dean Approval _____
Date _____

Graduate Council Approval _____
Date _____

Theresa Stack 4/12/2021

CRC Approval _____
Date _____

Faculty Senate Approval _____
Date _____

APPROVED
By Steven Gammon at 4:00 pm, Apr 19, 2021

VCAA Approval (see below) _____
Date _____

Chancellor Approval (see below) _____
Date _____

Academic Degree Program Proposal - Fiscal Analysis Form

CAMPUS:	Highlands College
AWARD LEVEL:	UG
PROGRAM NAME:	Certificate of General Studies
PROGRAM CODE:	

ENROLLMENT PROJECTIONS	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Headcount					
annual unduplicated headcount of students with declared major or minor within the program	5	10	10	10	10
Credit Hours					
annual avg. credits hours earned per student in program related curriculum	30	30	30	30	30
Student FTE					
Undergrad: (Headcount x CH)/30 Graduate: (Headcount x CH)/24	5	10	10	10	10
Completions					
Annual number of program completers	5	10	10	10	10

REVENUE					
Tuition Revenue (net of waivers)					
Institutional Support					
Other Outside Funds (grants, gifts, etc.)					
Program Tuition/Fees	$395	$790	$790	$790	$790
Total Revenue	$395	$790	$790	$790	$790
Total Revenue per Student FTE	$79	$79	$79	$79	$79

EXPENDITURES						
Tenure Track Faculty	FTE					
	Salary + Benefits					
Non-tenure Track Faculty *Includes Adjunct Instructors	FTE					
	Salary + Benefits					
Graduate Teaching Assistants	FTE					
	Salary + Benefits					
Staff	FTE					
	Salary + Benefits					
Total Faculty & Staff	FTE					
	Salary + Benefits	$395	$790	$790	$790	$790
Operations (supplies, travel, rent, etc)						
Start-up Expenses (OTO)						
Total Expenses		$395	$790	$790	$790	$790
Student FTE to Faculty (TT + NTT) Ratio		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Net Income/Deficit (Revenue - Expenses)		$0	$0	$0	$0	$0

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

Michael Van Altyne

Campus Chief Financial Officer Signature

Chief Financial Officer Comments

Total fees are $79 per certificate completion. Assume that the fees are used to cover all administrative expenses for the program.
There are no specific faculty or incremental headcount associated with the program. All classes currently are offered in existing programs.
Student FTE to Faculty ratio is not applicable in this instance.

Montana University System
REQUEST TO PLAN FORM

ITEM 1502-R0321 **Meeting Date March 2021**

Request to establish a Certificate in General Studies at Montana Technological University

Program/Center/Institute Title: **Certificate in General Studies** Planned 6-digit CIP code: **30.9999**

Campus, School/Department: **Montana Tech, Highlands College/Associate of Science** Expected Final Submission Date: **March 2021**

Contact Name/Info: **Michelle Morley, Director Associate of Science**

This form is meant to increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process. The completed form should not be more than 2-3 pages. For more information regarding the program/center/institute approval process, please visit http://mus.edu/che/arsa/academicproposals.asp.

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

We are submitting this request to plan for a Certificate of General Studies. Providing students the option to earn a Certificate in General Studies demonstrates completion of the required 30 credits of the Montana Tech and MUS Core should students transfer within the MUS.

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

The Certificate of General Studies serves to fulfill the requirements of the MUS Core recognizing students may want to complete their generals at Highlands College before transferring to another institution within the MUS. Providing the certificate demonstrates successful completion of the MUS core creating a smoother transition for students post-transfer and delivers a stackable credential in one year for those students who may want to earn the Associate of Science at Highlands College prior to enrolling in their four-year BS program at Tech or another institution within the MUS.

This certificate can also be used by the dual credit program at Montana Tech and Highlands College. Providing the opportunity to earn 30 credits that will count towards their four-year degrees. The Certificate provides a clear guideline of the courses students should be taking for dual-credit that will count directly towards their generals and four-year degrees. Currently many students take any courses that are available for dual-credit which may not go towards a degree increasing their cost and time to a degree.

3) **Describe any significant new resources (financial, staff, facility, new curricula) needed to launch and sustain the program/center/institute.**

There would not be an additional cost or new resources associated with the certificate as the courses are already available through Highlands College/Montana Tech.

4) Describe any efforts or opportunities you have identified for collaboration either within the institution or between MUS institutions (i.e. articulation, course-sharing, research collaboration).

Montana University System
REQUEST TO PLAN FORM

The certificate is currently offered at Gallatin College, Great Falls College and Miles Community College. The certificate is collaborative in that it fulfills the requirements for the MUS Core thus providing a clear transition between institutions and further fulfill the goals of the two-year mission within the MUS.

5) **Describe how the program/center/institute fits with the institutional mission, strategic plan, existing institutional program array, and academic priorities as described in the most recent Academic Priorities and Planning Statement.**

BOR Policy 301.10, "The Montana University System (MUS) is committed to facilitating the ease of undergraduate student transfer to its campuses, particularly in the area of general education." The Certificate of General Studies achieves this goal with a credential that can be counted as successful completion within the institution and for the student.

Aligning with Montana Technological University's Brand Promise Montana True, the Certificate of General Studies promotes a smart investment for students in Southwest Montana communities surrounding Butte who can stay in their hometowns and complete the MUS Core at the lower two-year tuition level before making the transition to other institutions within the MUS. The Certificate in General Studies would increase retention and completion rates for students who begin their studies either through dual-credit or as freshman by allowing students to earn a credential upon completion of the general education requirements.

Signature/Date	
Chief Academic Officer:	1/6/2021
Chief Research Officer*:	
Chief Executive Officer:	1/6/2021
Flagship Provost:**	n/a
Flagship President:**	n/a

*Center/Institute Proposal only
**Not applicable to the Community Colleges.

Montana University System
REQUEST TO PLAN FORM

MontanaTech

Certificate of General Studies

Effective 2021-2022

First (Freshman) Year

	Fall Semester Courses		Grade / Term
M 1xx	Mathematics Core[1,2]	3	/
P&L Sci 1xx	Physical & Life Science[2]	3	/
	Physical & Life Science Lab[2]	1	/
HUMN 1xx or 2xx	Humanities Elective[3]	3	/
SS 1xx or 2xx	Social Science Elective[3]	3	/
WRIT 101 **OR**	College Writing I		
WRIT 121	Intro to Technical Writing	3	/
		15/16	

	Spring Semester Courses		Grade / Term
P&L Sci 1xx	Physical & Life Science[2]	3	/
	Physical & Life Science Lab[2]	1	/
HUMN 1xx or 2xx	Humanities Core[3]	3	/
SS 1xx or 2xx	Social Science Core[3]	3	/
COMX 111 **OR**	Intro to Public Speaking		
COMX 230 **OR**	Presenting Technical Info		
WRIT 201	College Writing II	3	/
M 1xx **OR**	Mathematics Core[1,2]		
STAT	Statistics Course[1,2]	3	/
		15/16	

Completion of Montana Tech and MUS General Education Core[4]

Minimum Credits for Certificate in General Studies 30/31

[1] Students MUST register for math as indicated by college entrance or Accuplacer exams and follow the required sequence. This may increase the total degree credits.

[2] Physical & Life Science 1 course with lab required. Choose appropriate courses that will count towards BS in chosen field (Engineering, Biology, Nursing, Business, etc). See program in catalog or work with

[3] See General Education Requirements for acceptable courses.

[4] Upon completion of the 31 credits required in the core, students are eligible to receive a Certificate in General Studies from Highlands College/Montana Tech. The Certificate recognizes the completion of the core and is approved by the Montana University System Board of Regents. Students may use the Certificate to demonstrate completion of the core when transferring within the MUS or as a milestone to earning an Associate of Arts or Associate of Science degree at Highlands College/Montana Tech.

Additional Classes

___	___	_____	___	___/___	___	___	_____	___	___/___
___	___	_____	___	___/___	___	___	_____	___	___/___
___	___	_____	___	___/___	___	___	_____	___	___/___

UPDATED 9/19/18

OSH Minor

MontanaTech *OSH MINOR*

1. *Faculty Approvals (directly to CRC, then Faculty Senate):*
   X Amend an existing degree program. Making changes to programs such as adding a writing course to a major, changing the list of accepted electives or removing a requirement of a minor. Required Documents:
   X Existing Curriculum Worksheet
   X New Curriculum Worksheet, with changes highlighted

Date 11/30/2020
Dept. SHIH **College:** SME
Program BS OSH Minor **CRC Representative** Theresa Stack

Description of Request: Modify minor by adding all OSH and IH courses identified as 300 level and above for optional courses.

Current Course or Program Information: See below.

Proposed Change

Course # Name Credits Pre-req.
Change highlighted

Occupational Safety and Health Minor

Required Courses (6 credits)

- OSH 224 - Safety and Health Occupations and Programs *3 credits*
- OSH 226 - Safety Engineering & Technology *3 credits*

Choose 12 credits from the following courses:

- OSH 322 - Hazardous Materials Management *3 credits*
- OSH 323 - Fire Protection *3 credits*
- OSH 324 - Construction Safety *3 credits*
- OSH 406 - Small Particle Technology *2 credits*
- OSH 427 - Mining Safety *3 credits*
- OSH 454 - Ergonomics *3 credits*
- OSH 354 - Industrial Toxicology *3 credits*
- OSH 421 - IH I - Chemical & Biological Hazards *3 credits*
- OSH 416 - Industrial Ventilation *2 credits*
- OSH 422 - IH II - Physical Hazards *3 credits*
- OSH 444 - Law and Ethics for OSH *2 credits*
- OSH 460 - Risk Reduction Methods for OSH *3 credits*
- OSH 491 Special Topics (Various) *3 credits*

18 Total Credits required for Occupational Safety & Health Minor

Occupational Safety and Health Minor

Required Courses (6 credits)

- OSH 224 - Safety and Health Occupations and Programs *3 credits*
- OSH 226 - Safety Engineering & Technology *3 credits*

Choose 12 credits from the following courses:

- Any OSH or IH course identified as 300 level and above

18 Total Credits required for Occupational Safety & Health Minor

List of supporting documentation attached (See Level of Request for Requirements):
Provided in the CRC form

Assessment Leading to Request
Minor allows flexibility and reduces the need to change the minor as the catalogue of available courses evolves.

Anticipated Impacts to "Other" Programs
Improve minor options for other degree programs.

Impact on Library: _____ has consulted with _____ at the Montana Tech library to ensure needed materials and media are available. (Or **No consultation** is required since changes are only in the course number, course name, or course pre-requisites.)

Date to take effect: Fall 2021

MontanaTech *OSH MINOR*

APPROVALS

Department Head Approval _____ 2-2-21 **Date**

_____

Dean Approval

Date 3-1-21

Graduate Council Approval _____ Date

_____

CRC Approval _____ 3.30.21 Date

_____

Faculty Senate Approval _____

Date _____

VCAA Approval (see below) _____ Date

_____

Chancellor Approval (see below) _____

Date _____