Faculty Senate Minutes

4/25/2019

9-10 a.m.

Mill 201

Attendees: Charie Faught, Jackie Timmer, Tony Patrick, John Ray, Dan Autenrieth, Chad Okrusch, Ulana Holtz, Glen Southergill, Laura Young, Hilary Risser (for Atish Mitra), Ron White, Stella Capoccia, Miriam Young, Kishor Shrestha, David Reichhardt (for Mary North Abbott), Courtney Young, Phillip Curtiss, Chris Gammons, Doug Abbott

I. Welcome and Minutes (https://www.mtech.edu/facultystaff/facultysenate/minutes/index.html)
Move to accept minutes motion approved, seconded, all in favor.

Action Items

II. CRC Recommendations (see attached)
Motion to approve and seconded. **Motion Passed**

A second set of CRC recommendations was added after the agenda was distributed; faculty senators had not had a chance to review. Movement to table the CRC additions until Tuesday the 30th of April at 10 am, TBD; seconded. **Motion Passed.**

III. Northwest Commission on Colleges and Universities Revisions to Accreditation Standards Comments – Discussion on adding the Montana Tech collective faculty voice to the statement on academic freedom. Movement that we send this to the accrediting body as the voice of the senate; seconded. **Motion Passed**. Dr. Faught will forward this on to the accrediting body

Informational Items

IV. Full Faculty Meeting Update – overview
- a. Action items:
  - i. approved graduation list (passed)
  - ii. Change in bylaws to use Roberts rules (passed)
  - iii. Change in bylaws to conduct a faculty satisfaction survey each year (passed)
- b. Dr. Abbott discussed budget and dissemination of rumors.
- c. Deans presented summaries of college activities

V. Committee updates:
- a. Teaching Community: Nothing to report but agree to keep this activity on for the next academic year (19/20). Dr. H. Risser will visit with the current committee and find out who is interested in serving another year.

- b. Research Mentors: Nothing to report. The committee is interested in continuing. One suggestion was to bring grant-related speakers in. There was a positive response to the NIH speaker this past year.

- c. Budget committee: Faculty senate is still looking for someone who is budget savvy. The draft budget is currently balanced. Dr. Abbott explained that the budget is made up of state money and tuition (number of students) so the current estimate for the tuition budget is based on projections. He stated that May 1st is the drop-dead day where students can accept scholarships and declare tech as their school, we will

be closer to an accurate number at that point. Thus far, first-time freshman enrollment numbers are up; transfer numbers are down. Dr. Abbott informed the Senate that he and Mr. McClafferty committed to offering a 65% discount for the 100 empty dorm spots to entice the remaining undecided students. Any additional efforts to balance the budget falls to the deans to manage their budget.

d. Campus Committee Assessment: nothing to report.

Discussion Items

VI. Meetings for next academic year (and potentially one more this year): Moved to the agenda for Tuesday the 30th of April, 2019.

VII. Activities for next year: tabled

VIII. Other Items: Movement to adjourn; seconded. **Motion Passed**.

III. Northwest Commission on Colleges and Universities Revisions to Accreditation Standards Comments

http://www.nwccu.org/accreditation/standards-review/

From an e-mail received on April 1, 2019:

Over the last couple of weeks we have received emails regarding NWCCU's draft, revised Standards from AAUP affiliates and faculty senate chairs, and provosts of a few institutions. (Those individuals are copied on this email.)

Additionally, we have received input during conversations with some individuals.

Based on the recent input received, we've made a decision to incorporate appropriate language in our draft Standards for Academic Freedom and Governance, along with revisions on other matters suggested by others.

We've extended the deadline for submission of additional comments for revisions through April 15, 2019.

The draft will be revised and sent out for further comments in May. The draft will be revised based on this round of comments.

After the Commission has provided additional comments on the near final draft, it'll be revised as needed. Then it'll be sent out for a vote by NWCCU's family of institutions to approve the proposed Standards in late Summer 2019.

As I have noted previously, this is an iterative process and we appreciate the input, which continues strengthen the Standards.

Our hope is that, once approved, the new Standards will be deployed starting in January 2020.

If not already done, please connect with your relevant faculty organizations on your campuses, such as faculty senate chairs, and exhort them and other faculty to provide input regarding the draft Standards.

They may submit their comments on the current version of revised Standards available at (http://www.nwccu.org/accreditation/standards-review/) either via this link (https://www.tfaforms.com/4719938) or via email (standards@nwccu.org).

Thanks for your help.

Sonny Ramaswamy, President

Northwest Commission on Colleges and Universities

8060 165th Avenue NE, Ste 100 | Redmond, WA 98052

Email: sonny@nwccu.org

Tel: 425-558-4224

URL: http://www.nwccu.org

Twitter: @NWCCUSonny

IV. Faculty Senate Elections (bylaw changes- see attached)

Verbiage to the change in bylaws:

1) For department term turn overs: Individual departments will vote in new members no later than the 2nd to last meeting of the spring semester. New faculty senators should plan to attend the last two meetings of the year and participate in electing new officers.
2) Officer elections must take place with the faculty senators who represent the up-coming academic year and must take place no later than the last meeting of the spring semester
3) Elections of officers can take place electronically.
4) A Faculty Satisfaction Survey is part of the duties of the Faculty Senate and should be disseminated at least once per year. This survey must be anonymous and must be managed by at least one officer

Resolution to amend the Faculty Senate Bylaws to include:

"The rules contained in the current edition of ***Robert's Rules of Order Newly Revised*** shall govern the Faculty Senate of Montana Technological University in all cases to which they are applicable and in which they are not inconsistent with these bylaws and any special rules of order the Faculty Senate of Montana Technological University may adopt."

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date April 5, 2019
Dept. Business and Information Technology
College CLSPS
Program BIT, HIT Option
CRC Representative David Hood

Description of Request: Addition of Business and Information Technology, Health Information Technology Course

Current Course or Program Information: The course content is a unit in HCI 310, Health Care Delivery in the US part I.

Proposed Change

Course # Name	Credits	Pre-req.
HIT 422 Health Care Finance and Revenue Cycle Management	3	BFIN 322

This course will examine healthcare finance reimbursement systems. The student will be introduced to reimbursement to the healthcare administrator and provides them a comprehensive outlook on who are the payers in health care, the payment systems in health care, basic coding instruction, revenue cycle management, electronic medical record, what fraud and abuse is and how it can have a negative impact on your facility, some key tools that can have a negative impact on your facility if they are not managed daily such as transfer cases and high cost outliers, and tomorrow's trends. The student will also be introduced to other payment models and payer types such as managed care, commercial insurance, Medicaid and Medicare, pay-for-performance, value based purchasing, and accountable care organizations. Overall, this course will provide the student with the full picture of the mechanics of insurance and reimbursement and the impact they have on the financial aspect of healthcare organizations.

List of supporting documentation attached:
Syllabus Attached
Assessment Leading to Request
A small team consisting of industry experts and faculty at Montana Tech in the current CS, HCI, and Business Department have determined that the material is an essential component in a revised BIT/HIT degree that currently is only a unit within an existing HCI class.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: Charie Faught has consulted with Scott Juskiewicz (03/26/2019) 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 2019

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ Date 4/11/2019

Dean Approval _____ Date 4/11/19

Graduate Council Approval _____ Date _____

CRC Approval _____ Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ XXX Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☐ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

HIT 422 Health Care Finance and Revenue Cycle Management

Course: HIT 422

Course Instructor: Charie Faught

Course Title: Health Care Finance and Revenue Cycle Management

Total Credits: 3

Course Description*:
This course will examine healthcare finance reimbursement systems. The student will be introduced to reimbursement to the healthcare administrator and provides them a comprehensive outlook on who are the payers in health care, the payment systems in health care, basic coding instruction, revenue cycle management, electronic medical record, what fraud and abuse is and how it can have a negative impact on your facility, some key tools that can have a negative impact on your facility if they are not managed daily such as transfer cases and high cost outliers, and tomorrow's trends. The student will also be introduced to other payment models and payer types such as managed care, commercial insurance, Medicaid and Medicare, pay-for-performance, value based purchasing, and accountable care organizations. Overall, this course will provide the student with the full picture of the mechanics of insurance and reimbursement and the impact they have on the financial aspect of healthcare organizations.

Prerequisite: BFIN 322 Business Finance

Textbook(s): Harrington, M. (2016). *Health Care Finance and the Mechanics of Insurance and Reimbursement.* Burlington, MA: Jones and Bartlett.

Student Learning Outcomes:
By the end of the course, students will be able to:

1. Understand the creation and uses of reimbursement methods initiated by the Centers for Medicare and Medicaid Services (CMS).
2. Identify the differences between payment models such as fee-for-service and prospective payment models.
3. Describe the different types of medical claims that are created by healthcare providers that are submitted to insurance companies for payment.
4. Explain the differences between the various types of managed care plans.
5. Define the meaning and structure of coding methodologies such as ICD-9-CM, ICD-10-CM, and HCPCS.
6. Understand and describe components of the revenue cycle management.
7. Describe the importance of revenue cycle management in the acute care environment and the impact it can have on the healthcare organization.
8. Define Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)

Prerequisites by Topic:

- Basic English Writing Skills and Comprehension

Major Topics Covered in the Course:

- Health Care Financial Management
- Claims Processing
- Payer Types
- Revenue Cycle Management

Evaluation

Grading is based on the following:

90-100	A
80-89	B
70-79	C

60-69	D
59-below	F

Discussion and Other Assignments	65%
Quizzes and Exams	15%
Midterm Exam	10%
Final Exam	10%

Exams and will be taken in class (or online as applicable) during the designated time period. Cell phones, iPods, PDA's and other portable electronic devices must be turned off prior to the start of the exam or quiz.

Note: missed or late assignments, exams, quizzes or projects will be given a grade of 0.

- Academic Dishonesty

Plagiarism and cheating are serious offenses and may be punished by failure on the specific assignment, exam or final (or Project). This may also result in the failure of the class. Review the Montana Tech Policy in the Student Handbook (starting on page 16).

*This course description and syllabus is a working document and is subject to change throughout the semester

Learner Responsibilities and General Guidelines

- Review the course syllabus, the course description and goals, the Academic honesty and dishonesty policy, and this document.
- Post a reply indicating you have read the materials and ask for clarification of any of the requirements at this time.
- Read all required materials before completing any assignments.
- Become familiar with the Moodle system for the course, including the online course area.
- Assignments will be posted in corresponding week of Moodle.
- Discussion assignments will be posted in the corresponding week of Moodle. Discussion due dates will be included in the description of the assignment. Discussion assignments consist of two parts. The first part is the initial post with references. References must be in APA format, which is available using Word 2007 or higher. In order to facilitate discussions, students are required to post directly in the discussion area (as opposed to attaching a document).The second part is responding to at least one (and sometimes two) other learners as well as responding to the instructor as applicable. The response must consist of real feedback, and not just "this is a nice post." Due dates are listed at the end of the assignments.
- Exams are scheduled regularly throughout the semester, including a midterm and a final. All testing will be done using Moodle. Since some of the class is online, I will allow the use of materials such as the text and pdf files of the lectures, but all tests will be timed, meaning that if you do not complete it in the time allotted, the system will kick you out, and whatever is done will be graded. I will be discussing more about how to take exams in the near future.
- Recorded lectures will be made available in the weekly areas. All lecture materials as well as readings and assignments are fair game for testing purposes.
- Keep up with assignments and readings.
- Ask for clarifications about material or course expectations.
- Analyze assigned readings and offer thoughtful interpretations.
- Read all courseroom postings.
- Engage other learners by responding to their postings.
- Be respectful of diverse perspectives and refrain from making inappropriate comments in courseroom discussions and personal interactions.

In addition, HCI 310 is based on utilization of certain learning technologies, such as Moodle. All learners are expected to be familiar and utilize the classroom tools. This is especially true for online students who do not have access to campus computers. I strongly recommend that you familiarize yourself with the resources the first week of class in order to avoid any potential system issues. Taking an online or a distance course will actually be as hard, if not harder, than taking the regular course, but definitely a worthwhile learning experience. Keeping up with the coursework and good time management will help improve levels of success.

Course Syllabus/Spring 2020
HIT 422 Health Care Finance and Revenue Cycle Ma
Credit Hours: 3
Time: TBD
Location: CBB 001

Instructor: Charie Faught, PhD, MHA
Contact Information:
Office phone: 496-4884
E-mail: CFaught@mtech.edu
Office location: TBD
Office Hours:
Mon-Thurs 8:30-11:00
Tues and Thurs 1:00-3:00

Text(s):
Harrington, M. (2016). *Health Care Finance and the Mechanics of Insurance and Reimbursement.* Burlington, MA: Jones and Bartlett.

Day	Activity	
Week 1	Section 1: Introduction to HIT 422	
Tu	Course Structure, Goals and Grading	
Th	Introduction to Health Care Finance	Chapter 1
Week 2		
Tu	Financial Management	Chapter 2
Th		
Week 3		
Tu	Claims Processing	Chapter 3
Th		
Week 4		
Tu	Government Payer Types	Chapter 4
Th	Exam	
Week 5		
Tu	Affordable Care Act	Chapter 5
Th		
Week 6		
Tu	Managed Care Organizations	Chapter 6
Th		
Week 7		
Tu	Medicare Prospective Payment Systems	Chapter 7
Th		
Week 8		
Tu	Hospital Outpatient Prospective Payment	Chapter 8
Th		
Week 9		
Tu	Coding for Non-HIM Professional	Chapter 9
Th	Midterm Exam	
Week 10		
Tu	No Class- Spring Break	
Th	No Class- Spring Break	
Week 11		
Tu	Revenue Cycle Management	Chapter 10
Th		
Week 12		
Tu	Health Care Fraud and Abuse	Chapter 11
Th		
Week 13		
Tu	EHR and meaningful Use	Chapter 12
Th	Exam	
Week 14		
Tu	Government Incentive Programs	Chapter 13
Th		
Week 15		
Tu	Recovery Audit Contractors	Chapter 14
Th		
Week 16		
Tu	State Health Care Financing	TBD
Th		
Week 17		
Tu	Finals Week	

*This syllabus is a working document and is subject to change throughout the semester
** Other readings from sources other than the text may be assigned throughout the semester

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date April 5, 2019
Dept. Business and Information Technology
Program BIT, HIT Option
College CLSPS
CRC Representative David Hood

Description of Request: Revision of Business and Information Technology, Health Information Technology Option

Current Course or Program Information: The current catalogue version was approved on February 19, 2019, which was based on the 2017-2018 catalogue. Per program prioritization guidance, a small team consisting of members from the existing HCI IAB along with Montana Tech faculty from HCI, CS, and Business met to make changes to the degree. Changes to the overall "core" of the Business and Information Technology Degree are also included, which passed the CRC on 03/28/2019.

Proposed Change – see

Freshman Year:

1. Math 141 OR Math 151 (was just Math 141)
2. Math 142 OR Math 152 (was just Math 142)
3. COMX 111 OR COMX 230 (was just COMX 111)
4. CAPP 156 No longer required
5. CAPP 158 No longer required

Sophomore Year:

1. STAT 216 OR STAT 131 (was just STAT 216)

Junior Year:

1. BMIS 275 Now BMIS 320 (name and number change, per February CRC meeting) also moved from sophomore year to junior year
2. BGEN 363 OR HCI 316 (was just BGEN 363)
3. BMIS 375 now called Data Analytics (was Business Modeling II) change from spring semester to fall semester

Senior Year:

1. Remove BGEN 360 International Business, add Concentration Elective

Concentration Requirements:
ADD the following:

1. HIT 422 - Health Care Finance and Revenue Cycle Management (new course, no CCN, see CRC request) add as concentration requirement (pre-req BFIN 322 or consent of instructor)

Concentration Electives:
ADD the following:

2. CSCI 114- Programming with C# (concentration elective)
3. CSCI 321 Systems Design (concentration elective)
4. HCI 440-Data Integration and Exchange (concentration elective)

REMOVE the following:

1. HCI 420 - Public Health Informatics
2. HCI 312 Health Care Delivery in the US II
3. CSCI 310 - Advanced Visual Basic
4. CSCI 340 - Database Design
5. CSCI 347 - Data Mining

Change from Concentration Requirement to Elective

1. HCI 320 Information Systems Security

Changes to Existing HCI/HIT courses (clean-up):

1. **HIT 230 Overview of HCI Systems**
   a. Remove all pre-req's
   b. Change to 4 credits lecture only (no lab)
   c. Update Course Description (variation among catalogue versions, not currently accurate)

The course introduces the student to health information systems concepts, components, processes, and design. Topics include implementation of health information systems and the use of information systems technologies in a health care setting, including clinical applications systems, electronic medical records, and administrative and management applications.

   d. Update Learning Objectives

By the end of the course, students will be able to:

1. Differentiate among clinical and business departments and functions found in healthcare organizations and understand individual and team roles, responsibilities, and job descriptions in the field of Health Information Technology and Health Care Informatics.

2. Understand the processes integral to the Selection, Implementation, Support, and Maintenance of Health Information Systems and Applications.

3.To be able to describe and understand the major types of health care information (internal and external) that

a. Health care organizations capture and use.

b. Define the characteristics of quality data in health care.

c. To be able to identify and describe the major types of clinical information systems used in health care.

d. Identify and describe major types of administrative information systems.

2. **HIT 260 Workflow Process and Redesign**
   a. Update Course Description (current one based on older version no longer in use)

The course will provide learners with the knowledge, skills, and competencies necessary to plan and conduct a workflow and process analysis for a small healthcare organization in a way that supports the effective use of health information technology. The class will learn/review the steps the analyst needs to address quality improvement in health care, including the level of detail necessary for effective workflow and process mapping.

   b. Update Student Learning Objectives

1. Understand quality improvement within healthcare, with an emphasis on Lean Process Improvement as a process improvement methodology.

2. Create basic diagrams and maps of health care work/business processes.

3. Develop facility with the basic vocabulary, terms, and definitions of the major concepts supporting LEAN process improvement efforts.

4. Evaluate operations within a health care organization as a collection of processes, with inputs that determine the output(s); including the ability to analyze and diagram processes using LEAN documentation tools and techniques.

5. Understand and apply the five-part PDCA model as a framework to organize process improvement activity.

6. Employ a range of LEAN process improvement techniques, such as 5S, within the context of the PDCA model.

7. Recognize the organizational and structural factors that are relatively to unique to health care organizations and how these may affect a process improvement effort.

c. Remove all pre-req's

3. HCI 310
   a. Remove all pre-req's
4. HCI 320
   a. Change pre-req's to junior or higher standing or consent of instructor
5. HCI 410
   a. Change pre-req's to junior standing or consent of instructor
6. HCI 440
   a. Description not listed in catalogue

Data Integration (DI) is a process in which heterogeneous data is retrieved and combined in a structured format as either data sets or in one or more database tables. Data integration allows different data types to be merged by organizations and applications for the support of business processes and/or functions. The business functions supported by data integration may involve support for operations, analytics, data marts and data warehouses.

ETL (Extract, Transform and Load) is the primary technology that supports data integration. The course uses metadata tools and relational database management tools to illustrate the three database functions (ETL) that are combined into a common tool to retrieve information from a data source, convert the data, and load it into another database or target file.

b. Change pre-req's to BMIS 375 or consent of instructor

List of supporting documentation attached:
Curriculum worksheet and revisions as noted in the above cleanup attached.
Assessment Leading to Request
A small team consisting of industry experts and faculty at Montana Tech in the current CS, HCI, and Business Department have reviewed the existing BIT/HIT option as compared to courses offered within the existing HCI program.

Anticipated Impacts to "Other" Programs
None anticipated.

Impact on Library: Charie Faught has consulted with Scott Juskiewicz (03/26/2019) 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 2019

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ Date 4/11/2019

Dean Approval _____ Date 4/11/19

Graduate Council Approval _____ Date _____

CRC Approval _____ Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

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- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
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OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

MontanaTech *Curriculum Change Request Form Dated 2 Feb 2017*

Protocol: The department requesting curriculum change holds a discussion at the departmental level, and if agreed upon by the department head, discuss with the Dean for approval. Forward the completed form along with supporting information to the CRC chair after approval from the department head, dean, and graduate council if necessary. Final changes are then made by the registrar after faculty senate approval. Guidance: https://www.umt.edu/provost/faculty/curriculum/default.php.

Date 4/15/19
Dept. Petroleum Engineering College SME
Program: BS Petroleum Engineering

Description of Request/Summary:

Change order of some classes in curriculum to accommodate changed course offering in another department and to better prepare students for senior-level (PET 446) class.

Current Course Program Information:

The current curriculum plan lists the courses as they have been offered up to this semester. The changes on the new curriculum plan do not change any of the courses that are currently required, it just changes the order in which they are taken.

Proposed Change (Attach syllabus or curriculum for new course or curriculum changes.)

Course # Name	Credits	Pre-req.

Move GEOE 357 – Subsurface Methods in Petroleum Geology to from fall semester junior year to spring semester sophomore year because the GEOE department will only be offering it during the spring semester.

Move Humanities elective from spring semester sophomore year to fall semester senior year to make room for the GEOE 357 change.

Move the EGEN 325 – Engineering Economic Analysis course from fall semester senior year to spring semester junior year to ensure that all students will complete this course before taking the PET 446 – Petroleum Project Evaluation.

Move the WRIT 321 – Advanced Technical Writing course from spring semester junior year to fall semester junior year to take the place of the GEOE 357 course that was moved and make room for the EGEN 325 course in spring junior year.

List of supporting documentation attached:

Copy of 2018-19 and the new 2019-20 curriculum worksheets with the changes highlighted are attached.

Assessment Leading to Request

These changes accommodate a changed course offering in another department and better prepare students for senior-level (PET 446) class..

Anticipated Impacts to "Other" Programs: None.

Impact on Library: None.

Date to take effect: Fall 2019 Catalog

LEVEL of Request

Please indicate the type of request(s) by selecting *all that apply*:
Faculty Approvals (directly to CRC, then Faculty Senate):

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- ☐ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.

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OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- [ ] Re-titling an existing postsecondary educational program
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APPROVALS

Department Head Approval _____ **Date** 9/16/2019

Dean Approval _____ **Date** _____

VCAAR Approval (see above) _____ **Date** _____

Chancellor Approval (see above) _____ **Date** _____

Graduate Council Approval _____ **Date** _____

CRC Approval _____ 4-18-19 **Date** _____

Faculty Senate Approval _____ **Date** _____

Department of BIT

HIT OPTION

Freshmen

BGEN 105	Introduction to Business	3	COMX 111	Intro to Public Speaking or	3
WRIT 101	College Writing	3	COMX 230	Presenting Technical Information	
M 141	Math For Business or Soc Sci I or	3	M 142	Math For Business or Soc Sci II or	3
M 151	Precalculus		M 171	Calculus I	
	Physical Science Elective	3		Physical Science Elective and lab*	4
	Free Elective	3		Humanities Elective	3
				Free Elective	2
		15			15

Sophomore

Fall Semester			Spring Semester		
BGEN 235	Business Law I	3	ACTG 202	Principles of Managerial Actg	3
BGEN 285	Critical Thinking and Deci Making	3	ECNS 202	Principles of Macroeconomics	3
ACTG 201	Principles of Financial Actg	3	STAT 216	Intro to Stats OR STAT 131 Intro to Biostats	3
ECNS 201	Principles of Microeconomics	3		Free Elective	3
	Free Elective	3		Free Elective	3
		15			15

Junior

Fall Semester			Spring Semester		
BGEN 363	Business Ethics OR HCI 316 HC Ethics and Regulations	3	BMIS 320	Business Modeling	3
BMIS 375	Data Analytics	3	BMKT 325	Marketing	3
BMIS 311	Management Information Systems	3		Concentration Requirement/Elective	3
MGMT 335	Management and Organization	3	WRIT 322	Advanced Business Writing	3
	Concentration Requirement/Elective	3		Concentration Requirement/Elective	3
		15			12

Senior

Fall Semester			Spring Semester		
BFIN 322	Business Finance	3	BMGT 426	Strategic Management	3
MGMT 322	Operations Management	3	BMIS 453	Bus Intel and Big Data Anal	3
	Concentration Requirement/Elective	3		Concentration Requirement/Elective	3
	Concentration Requirement/Elective	3		Concentration Requirement/Elective	3
	Concentration Requirement/Elective	3		Concentration Requirement/Elective	3
		15			15

Health Information Technology Option

Concentration Requirements

HCI 410	Project MGT and System Analysis	4
HIT 230	Overview of HCI Systems	4
HIT 260	Workflow Process and Redesign	3
HCI 310	Health Care Delivery in the US Part I	3
HIT 422	Health Care Finance and Revenue Cycle Management	3
	Total Concentration Requirements	17

Concentration Electives (pick 4)

CSCI 114	Programming with C#	10
HCI 320	Information Systems Security	
HCI 440	Data Integration and Exchange (Add HIE)	
CSCI321	Systems Design	
HIT 265	EHR in Medical Practice	
BMIS 498	Internship	
BMIS 415	MGT of IT	
	others as approved by department head	
Total Concentration Electives/Requirements		**27**

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date March 26, 2019
Dept. Health Care Informatics **College** CLSPS
Program: Health Care Informatics **CRC Representative Kristi Bailey**

Description of Request: The request is due to the moratorium of the associates and bachelor's degree in Health Care Informatics and the transfer of some but not all of the courses to the new Business and Information Technology, Health Information Technology degree (BIT/HIT). There is still an audience at Montana Tech such as nursing and computer science students who are interested in pursuing additional skills. There is also still a need in the state of Montana and beyond for professionals in health care informatics, for which a minor is a pathway to the profession. The revised curriculum reflects the changes that will occur with courses found within the BIT/HIT degree. It also reflects industry requirements in the field, as viewed by members of the BIT/HIT review team and others.

Current Course or Program Information: The minor is designed for students in another four year degree program at Tech. The HCI minor gives students additional skills and knowledge that they can apply to the health care industry (such as business students) or in the informatics field (such as nursing).

Same #

Proposed Change

Course # Name	Credits	Pre-req.
See attached worksheet. Courses to be removed are		
HIT 101 Introduction to Health Care Informatics- 3 Credits		
HCI 312 Health Care Delivery in the US II- 3 credits		
HCI 420 Public Health Informatics- 3 credits		
HCI 4946 Health Care Informatics Seminar- 2 credits		
Courses to be added are		
HIT 422 Health Care Finance and Revenue Cycle Management- 3 credits		
HCI 440 Data Integration and Exchange- 3 credits		

List of supporting documentation attached:

1. Curriculum worksheet

Assessment Leading to Request

As noted above, the moratorium of the HCI associate's and bachelor's degree led to a review of the HCI minor.

Anticipated Impacts to "Other" Programs

No impacts are anticipated- the courses listed will be part of the new BIT/HIT degree (no new courses expected).

Impact on Library: Charie Faught has consulted with Scott Juskiewicz (03/26/2019) 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 2019

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ Date 4/11/19

Dean Approval _____ Date 4/11/19

Graduate Council Approval _____ Date _____

CRC Approval _____ 4-18-19 Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☐ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ XXX 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

Application for a Minor
Health Care Informatics

Name: _____

Major: _____ Student ID#_____

NOTE: At least one-third of courses used must be upper division (300 - 400).

Please list below the courses you are using to complete the requirements for your HCI Minor

Course	Course Title	Credits	Term Completed	Grade Received
Required:				
~~HIT 101~~	~~Introduction to Health Care Informatics~~	~~3~~		
HCI 316	Health Care Ethics and Regulations	3		
HCI 310	Health Care Delivery in the US I	3		
Optional Courses (must complete 9 credits)				
HIT 260	Workflow Process & Redesign	2		
HIT 230	Overview of HCI Systems	4		
HCI 320	Information Systems Security	3		
~~HCI 312~~	~~Health Care Delivery in US II~~	~~3~~		
HIT 265	Electronic Health Record in Medical Practice	3		
HCI 410	Project and Systems Management	4		
~~HCI 420~~	~~Public Health Informatics~~	~~3~~		
~~HCI 4946~~	~~Health Care Seminar~~	~~2~~		

HCI Minor NEW!

Course	Course Title	Credits	Term Completed	Grade Received
Required:				
HIT 260	Workflow Process & Redesign	3		
HCI 316	Health Care Ethics and Regulations	3		
HCI 310	Health Care Delivery in the US I	3		
Optional Courses (must complete 9 credits)				
HIT 230	Overview of HCI Systems	4		
HCI 320	Information Systems Security	3		
HIT 265	Electronic Health Record in Medical Practice	3		
HCI 410	Project Management and Business Analysis	4		
HIT 422	HC Finance and Revenue Cycle MGT	3		
HCI 440	Data Integration and Exchange	3		

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date 04/09/2019
Dept. Civil Engineering — College School of Mines and Engineering
Program Civil Engineering Program — CRC Representative Dr. Liping Jiang

Description of Request: To obtain common course numbering for the 10 special topics courses that continue to be taught through the Civil Engineering Department as a part of the 128 credit curriculum. To relocate specific courses to different semesters, to realign pre-requisites for select courses, and to modify the list of professional electives to better accommodate students in the program. To terminate courses that are no longer being offered.

Current Course or Program Information:

Up for adoption of Common Course Numbering:

1) ECIV 291 for ECIV 2XX Civil Engineering Plans Details and Specifications (3 cr)
2) ECIV 391 for ECIV 3XX Temporary Structures (3 cr)
3) ECIV 491 for ECIV 4XX Sustainable Engineering (3 cr)
4) ENGR 491 for ECIV 4XX Open Channel Hydraulics (3 cr)
5) ENGR 5500 for ECIV 4XX/5XX Hydraulic Structures (3 cr)
6) ECIV 491 for ECIV 4XX Building Inspections (3 cr)
7) ECIV 491 for ECIV 4XX Structures II, Rename to Structural Design (3 cr)
8) ECIV 491W Senior Design for Civil Engineers I (2 cr)
9) ECIV 491W Senior Design for Civil Engineers II (1 cr)
10) ECIV 491 for ECIV 4XX F.E. Review for Civil Engineers (1 cr)

Changes to pre requisites, location in catalog, or course offering:

11) ECIV 208 Construction Contracts (3 cr)
12) ECIV 307 Construction Bidding and Estimating (3 cr)
13) Min 210 Principles of Plane Surveying (3 cr)
14) ECNS 201, ECNS 202, or ECNS 203 Principles of Micro Economics, Principles of Macro Economics, or Principles of Micro and Macro Economics respectively (3 cr)
15) ECIV 486, Soil Mechanics and Foundation Design

Changes to Professional Electives:

16) ECIV 491 Fundamentals of Pavement Design

Proposed Change

Course # Name	Credits	Pre-req.
Up for adoption of Common Course Numbering		
ECIV 2XX C.E. Plans Details and Specs. ECIV 225	3	C. E. Major, or, Instructor Consent
ECIV 3XX Temporary Structures ECIV 302	3	ECIV 312 pre req, or, ECIV 312 co req
ECIV 4XX Sustainable Engineering ECIV 402	3	C.E. Major, upper division, or, Instructor Consent
ECIV 4XX Open Channel Hydraulics ECIV 431, Locking-ish	3	EGEN 335
ECIV 4XX/5XX Hydraulic Structures ECIV 443	3	ECIV 4XX Open Channel Hydraulics
ECIV 4XX Building Inspections ECIV 407	3	ECIV 2XX C.E. Plans Details and Specs.
ECIV 4XX Structural Design ECIV 440	3	ECIV 312 Structures I
ECIV 4XXW Senior Design for Civil Engineers I, ECIV 489 Locking-ish	2	C.E. Major, Senior Standing, or, Instructor Consent
ECIV 4XXW Senior Design for Civil Engineers II, ECIV 499 Locking-ish	1	ECIV 4XXW Senior Design for Civil Engineers I
ECIV 4XX F.E. Review for Civil Engineers, ECIV 458	1	C.E. Major, Senior Standing, and Consent of Instructor
Changes to pre requisites, location in catalog, or course offering		
ECIV 208 Construction Contracts	3	C.E. Major, or, Instructor Consent
ECIV 307 Construction Bidding and Estimating	3	ECIV 208 Construction Contracts
Min 210 Plane Surveying	3	Move to Fall Semester of Junior Year
ECNS 201, or ECNS 202, or ECNS 203	3	Move to Fall Semester of Sophomore Year
ECIV 304 Construction Means and Methods	3	Remove from Catalog, no longer taught
ECIV 486 Soil Mechanics and Foundation Design	3	ECIV 312 pre req, or, ECIV 312 co req
Changes to Professional Electives		
ECIV 491 Pavement Design	3	Remove from Professional Electives, no longer taught

Add, "Additional courses that are offered by the Civil Engineering Department at the 300 level or higher may be used as a professional elective where not required elsewhere in the 128 credit curriculum."

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

1) **ECIV 2XX C.E. Plans Details and Specs:** Students will be able to interpret design details, blueprints, and specifications. This course also helps students to successfully practice the Civil Engineering Profession in their career

2) **ECIV 3XX Temporary Structures:** Students will be able to analyze and design temporary bridge beams, scaffolding, formwork, piles, dewatering and pumps, excavations. Students will also be exposed to related safe practices.

3) **ECIV 4XX Sustainable Engineering:** Students will be able to understand the LEED process for high-performance, Green Buildings that are constructed to be energy efficient, be healthy for its inhabitants, reduce carbon foot print.

4) **ECIV 4XX Open Channel Hydraulics:** Students will be able to gain an understanding of the fundamentals of open-channel flow, energy, and momentum principles that include critical flow, normal flow, and gradually-varied flow. Topics include: Water surface profile classification and computation, analysis and design of open channels and hydraulic structures and modeling.

5) **ECIV 4XX/5XX Hydraulic Structures:** Students will be able to analyze and design **for** rainfall events and carry out excess calculations, channel routing, runoff. Students will also be able to: size gutter, storm, and sewer components; culverts, detention basins, and infiltration basins

6) **ECIV 4XX Building Inspections:** Students will be able to gain an understanding of relevant commercial, industrial, and residential building codes and inspection procedures for electrical, plumbing, sewer, gas, structural, HVAC, and special occupancies.

7) **ECIV 4XX Structural Design:** Students will be able to analyze and design components and systems for wood structures, for steel structures, and for reinforced concrete structures. Students will also be able to reference and incorporate the national design specifications for wood, the steel construction manual, and the ACI code for concrete into contemporary analysis and design procedures.

8) **ECIV 4XXW Senior Design for Civil Engineers I, and, 9) ECIV 4XXW Senior Design for Civil Engineers II:** Students will be able to partake in and complete a capstone engineering design sequence that requires students to apply engineering principles to industry or C.E. department sponsored projects over two semesters that are selected by the instructor with department head approval. Students will be assigned to teams and contribute to engineering projects that require multiple constraints.

10) **ECIV 4XX F.E. Review for Civil Engineers:** Students will partake in a guided self-study and national exam preparation though a comprehensive review of topics that are pertinent to the F.E.-Civil Exam.Students shall complete a minimum of 400 problems out of the F.E. Civil Practice Book by Lindeburg, The problems are then submitted to the instructor to becoming eligible to register for the class. Once admitted to the course, Senior standing, Civil Engineering Students shall then registers for, and take, the Civil Engineering F.E. exam. Students shall then furnish proof of taking and/or passing the exam to the instructor before finals week, in fulfillment of the course requirements.

List of supporting documentation attached:

1. **All courses up for CCN have syllabii attached**
2. **A Curriculum Work Sheet is attached**

Assessment Leading to Request

The 2018 2019 C.E. Catalog underwent major revisions in comparison to previous years. The assessment leading to the request is based on student advising and common course numbering.

Anticipated Impacts to "Other" Programs

None are anticipated.

Impact on Library: Brian Kukay has consulted with Sott Juskiewicz (04/10/19) 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: August 26, 2019

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval Brian Ivey Date 4/10/19

Dean Approval [signature] Date 4-10-19

Graduate Council Approval N/A Date _____

CRC Approval [signature] 4-18-19 Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☑ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☑ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☑ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

Student ID:_____
Student Name:_____
Adviser Name:_____

Catalog: 2018-2019 Catalog — FOR 2019-2020 CATALOG
Program: ~~Civil Engineering~~, B.S.
Minimum Credits Required:_____

Civil Engineering, B.S.

Freshman

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
CHMY 141 - College Chemistry I	*3 credits*			
CHMY 142 - College Chemistry Laboratory I	*1 credit*			
EGEN 101 - Introduction Engineering Calculations & Problem Solving	*3 credits*			
M 171 - Calculus I	*3 credits*			
Humanities Elective *3 credits*				
EGEN 194 - Freshman Engineering Seminar	*1 credit*			
WRIT 121 - Introduction To Technical Writing	*3 credits*			
-OR-				
WRIT 101 - College Writing I	*3 credits*			

Total: 17

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
M 172 - Calculus II	*3 credits*			
PHSX 234 - General Physics-Mechanics	*3 credits*			
Humanities Elective *3 credits*				
CHMY 143 - College Chemistry II	*3 credits*			
-OR-				
OSH 2246 - Safety and Health Occupations and Programs	*3 credits*			
-OR-				
OSH 2266 - Safety Engineering & Technology	*3 credits*			
GEO 101 - Introduction to Physical Geology	*3 credits*			
-OR-				
BIOE 185 - Envirornmental & Ecological Issues	*3 credits*			

Total: 15

Sophomore

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
EGEN 201 - Engineering Mechanics–Statics	*3 credits*			
M 273 - Multivariable Calculus	*4 credits*			
PHSX 235 - General Physics-Heat, Sound & Optics	*3 credits*			
PHSX 236 - General Phy-Heat, Sound & Optics Lab	*1 credit*			
MIN 210 - Plane Surveying	*3 credits*			
ECIV 215 - Introduction to Modeling for Civil Engineers	*1 credit*			
ECIV 208 - Construction Contracts and Introduction to Construction Engineering	*3 credits*			

— MOVE TO JUNIOR FALL SEMESTER

— CURRENTLY THERE ARE NO PREREQS.. CHANGE TO CE. MAJOR, OR, INSTRUCTOR CONSENT

Total: 18

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
EGEN 202 - Engineering Mech–Dynamics	3 credits			
M 274 - Introduction to Differential Equation	3 credits			
PHSX 237 - General Physics-Electricity, Magnetism & Motion	3 credits			
ECIV 291 Civil Engineering Plans Details and Specs 3 credits				
EGEN 305 - Mechanics of Materials (equiv 205)	3 credits			
ECIV 304 - Construction Means and Methods	3 credits			
-OR-				
ECIV 307 - Construction Bidding and Estimating	3 credits			

Total: 18

Junior

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
WRIT 321W - Advanced Technical Writing	3 credits			
ECIV 312 - Structures I	3 credits			
EGEN 325 - Engineering Economic Analysis	3 credits			
ECIV 491 Building Inspections 3 credits				
ECNS 201 - Principles of Microeconomics	3 credits			
-OR-				
ECNS 202 - Principles of Macroeconomics	3 credits			
-OR-				
ECNS 203 - Principles of Micro and Macro	3 credits			

Total: 15

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
EGEN 306 - Mechanics of Materials Laboratory	1 credit			
STAT 332 - Statistics for Scientists and Engineers	3 credits			
EGEN 335 - Fluid Mechanics	3 credits			
EGEN 336 - Fluid Mechanics Lab	1 credit			
ECIV 350 - Transportation Engineering	3 credits			
ECIV 491 ~~Structures II 3 credits~~				

Total: 14

Senior

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
ECIV 391 Temporary Structures 3 credits				
ECIV 486 - Soil Mechanics & Foundation Design	3 credits			
ECIV 491 Open Channel Hydraulics 3 credits				
ECIV 491 F.E. Review for Civil Engineers 1 credit				
Free Elective 3 credits				
ECIV 491W Senior Design for Civil Engineers 2 credits				

Total: 15

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed

ECIV 405 - Construction Project Planning and Scheduling (Or ECIV 505)	*3 credits*			
ECIV 491/ENGR 5500 Hydraulic Structures *3 credits* ECIV 491 Sustainable Engineering *3 credits* Professional Elective *3 credits** Social Science Elective *3 credits* ECIV 491W Senior Design for Civil Engineers *1 credit*				
Total: 16				

Minimum credits for a B.S. degree in Civil Engineering: 128

Notes:

* 3 Professional Elective credits required. Approved Professional Electives inlcude: EENV 402 Surface Water Hydrology 3 cr., OSH 3246 Construction Safety 3 cr., ECIV 487 Soil Mechanics and Foundations Lab 1 cr. ECIV 491 Fundamentals of Pavement Design 3 cr., Internship (Must be of junior or senior standing, 1 cr., 1 time only.

Notes:

Add, "Additional courses that are offered by the Civil Engineering dept at the 300 LEVEL OR higher may be used as A professional elective, where not required elsewhere in the curriculum."

REMOVE from professional electives list

1. Course number and name: **ECIV 291-02, Civil Engineering Plans, Details, and Specifications**
2. Credits and contact hours: 3 credits, 3 contact hours
3. Instructor's or course coordinator's name: Kishor Shrestha, Ph.D., P.E., LEED Green Assoc.
4. Text book, title, author, and year: PRINTREADING for CONSTRUCTION Residential and Commercial By Walter C. Brown & Daniel P. Dorfmueller, 6th Edition
    a. Other supplemental materials: Currently: None
5. Specific course information
    b. Brief description of the content of the course (catalog description): This course will focus on reading the blue prints and the construction specifications. Having this course is the first step to take any structure and estimating courses. Reading the blue prints of residential buildings, commercial buildings, structural drawings are focused.
    c. Prerequisites or co-requisites: Civil Engineering Major, or, Instructor Consent
    d. Indicate whether a required, elective, or selective, or selected elective (as per Table 5-1) course in the program: Required course for Civil Engineering students
6. Specific goals for the course:

    The student will learn about the discipline of sustainability and be able to apply that knowledge to the design and construction procedure of sustainable infrastructures.
    a. Specific outcomes of instruction: Students will be able to read design and construction drawings as well as will be familiar with CSI construction specification. This course also helps students to successfully practice the Civil Engineering Profession in their career.
    b. Explicitly indicate which of the student outcomes listed in criterion 3 or any other outcomes are addressed by the course: None

7. Brief list of topics to be covered
    i. Course Introduction;
    ii. Organization of Construction Drawings;
    iii. Lines and Symbols;
    iv. Specifications and Building Codes;
    v. Construction Materials;
    vi. Site Plans;
    vii. Architectural Drawings;
    viii. Foundation Drawings;
    ix. Structural Prints;
    x. Residential Framing Prints;
    xi. Plumbing Prints; HVAC Prints;
    xii. Electrical Prints;
    xiii. Welding Prints; and
    xiv. Estimating Construction Costs.

1. Course number and name: ECIV 391-02, Temporary Structures
2. Credits and contact hours: 3 credits, 3 contact hours
3. Instructor's or course coordinator's name: Kishor Shrestha, Ph.D., P.E., LEED Green Assoc.
4. Text book, title, author, and year: Temporary Structure Design, Chris Souder, current edition: John Wiley & Sons, Inc., Hoboken, New Jersey
    a. Other supplemental materials: Currently: Civil Engineering Reference Manual for the P.E. Exam, M.R. Lindeburg, 15th edition
5. Specific course information
    a. Brief description of the content of the course (catalog description): The emphasis of this course is Temporary Structure used at construction sites– analyzing and design of temporary bridge beams, scaffolding, formworks, piles, dewatering and pumps, shored and non-shored excavations, construction safety: personal protective system, and pipe support design.
    b. Prerequisites or co-requisites: ECIV 312 Pre Requisite, or, ECIV 312 Co Requisite
    c. Indicate whether a required, elective, or selective, or selected elective (as per Table 5-1) course in the program: Required course for Civil Engineering students
6. Specific goals for the course:

    To provide real onsite design and analysis problems regarding various temporary structures. The student will learn about the discipline of structures soil mechanics and be able to apply that knowledge to the design and analysis of various temporary structures used at construction sites.
    a. Specific outcomes of instruction: Analyze and design temporary bridge beams; formworks for walls, columns, and slab; scaffolding planking, bearer, and posts, minimum waterway required for a temporary culvert at a construction site, minimum required depth of a pile, and other select topics.
    b. Explicitly indicate which of the student outcomes listed in criterion 3 or any other outcomes are addressed by the course:
        i. A recognition of the need for, and an ability to engage in life-long learning

7. Brief list of topics to be covered

   Review of Statics

   Temporary Bridge Design

   Design and Analysis of Scaffolding

   Design of a Pipe Support

   Review of Soil Mechanics

   Non-Shored System for Earthwork Excavation

   Shored System for Earthwork Excavation

   Design of Piles

   Concrete Formwork Design for Concrete Walls

   Safety: Personal Protective System Design

   Dewatering and Pumps

1. Course number and name: ECIV 491-02, Sustainable Engineering
2. Credits and contact hours: 3 credits, 3 contact hours
3. Instructor's or course coordinator's name: Kishor Shrestha, Ph.D., P.E., LEED Green Assoc.
4. Text book, title, author, and year: LEED Green Associate Exam Preparation Guide LEED v4 Edition, Heather C. McCombs, Orland Park, Illinois 60467-5756 (2015).
    a. Other supplemental materials: Sustainable Construction 4th Edition by Charles J. Kibert, current edition: John Wiley & Sons, Inc., Hoboken, New Jersey (2016)

5. Specific course information
    a. Brief description of the content of the course (catalog description): This course deals with engineering design and LEED process of high-performance Green Buildings, which are constructed to be energy efficient, to be healthy for the people who live or work in them, and to reduce carbon foot print..
    b. Prerequisites or co-requisites: C.E. Major, Upper Division, or, Instructor Consent
    c. Indicate whether a required, elective, or selective, or selected elective (as per Table 5-1) course in the program: Required course for Civil Engineering students
6. Specific goals for the course:

    The student will learn about the discipline of sustainability and be able to apply that knowledge to the design and construction procedure of sustainable infrastructures.
    a. Specific outcomes of instruction: The students will be able to analyze and design sustainable infrastructures. Students will have sound command in understanding the LEED certification procedure and design principles.
    b. Explicitly indicate which of the student outcomes listed in criterion 3 or any other outcomes are addressed by the course:
        h. Understand global, environmental, and societal issues
        l. Analyze and solve problems in technical area of Civil Engineering

h. Brief list of topics to be covered

Becoming a LEED Green Associate

The Test Process

LEED v4 Core Concepts and Themes

Overview of USGBC and LEED

Location and Transportation

Sustainable Sites

Water Efficiency

Energy and Atmosphere

Materials and Resources

Indoor Environment Quality

Innovation and Regional Priority

Primary References

Montana Tech
Department of Civil Engineering

Course	ECIV 491-05 Open Channel Hydraulics, MWF 1:00 - 1:50 pm, S&E 308
Course Website	https://lipingjiang.wixsite.com/ECIV491-05 Password: Channel (Case Sensitive)
Textbook	Open Channel Hydraulics, A. Osman Akan, Butterworth-Heinemann (Elsevier)
Instructor	Dr. Liping Jiang , S&E 304, 406-496-4771, ljiang@mtech.edu
Office Hours	TR 10:50 – 12:50 or by appointment (email)
Civil Engineering-Program Educational Objective	1. Successfully practice the Civil Engineering Profession 4. Continued professional development
Student Outcomes	g. An ability to communicate effectively via g.2 Oral communication

Tentative Schedule

Topics	Chapters	No. of Classes
Fundamentals of open-channel flow	Chapter 1	6
Energy and momentum principles Critical flow, specific energy, and hydraulic jump	Chapter 2	8
Exam 1 (10/01/2018)		1
Normal flow & Manning's equation	Chapter 3	5
Gradually-varied flow Water surface profile classification and computation	Chapter 4	9
Exam 2 (11/05/2018)		1
Design of open channels	Chapter 5	5
Hydraulic Structures and modeling	Chapter 6	5
Bridge hydraulics and modeling	Chapter 7	5
Final (Refer to final exam schedule for day and time)		

Note: 1. Exam 1 covers Chapters 1-2, Exam 2 covers Chapter 3-4, and Final focuses on Chapter 5-7 but also covers other Chapters

Course grading

Course Grading	Tentative point distribution
Homework	30%
Quiz	5%
Midterms (2)	35%
Final	30%

Score (%)	90 -100	80 - 89	70 -79	60 - 69	<60
Grade	A	B	C	D	F

Course Policy and Suggestions

(1) All quizzes and examinations will be **closed book** and **no notes** except **one-page summary note**. Necessary equations will be posted on the screen during examinations. **Each student can bring one-page summary note (8.5*11'', writing on one-side, font size no less than 12) that summarizes equations, meanings of equations and symbols, unit conversion, constants, and subjects learned but NO problem solutions-May be collected and examined by instructor.** Final grades are non-negotiable.

(2) Two types of homework or practice problems: **(a)** some problems will be graded and homework may be from other textbook, **(b)** suggested but will not be collected and graded. Some homework problems for (b) option may be part of any exam. **Understanding the assigned problems for (b) is the individual student's responsibility.**

(3) Homework problem format: 1) **GIVEN** (must include all given information) 2) **FIND** (must include what is to be determined 3) **SOLUTION** (neat and orderly solution to the problem in 8.5*11" paper, please stapled all pages) 4) Include a **cover page** (Your name, course number) and assignment sheet(s). If not followed, grades will be adjusted accordingly.

(4) No later or makeup homework will be accepted. There is no makeup in-class homework. If you will miss a quiz/exam due to illness, you need notify me **in advance (before the quiz/exam starts)** by email or call me; otherwise you will not be allowed to make up any quiz/exam. I will make the decision from doctor's permission about making up the exam.

(5) A complete and organized notebook of solved problems is the logical step for examination preparation. Carefully prepare one-page equations for examinations.

(6) The course grade will depend primarily on **problem solving** which **require practice**. Any questions related to specific problems are encouraged during lecture and office hours.

(7) All students are expected to attend every class. It is your responsibility to obtain all information presented in each class missed. When a student has accumulated **six** unexcused class meetings he/she will be recommended for dismissal from the course. On days of poor attendance, surprise quizzes may be given. Class attendance and methodical effort are important factors for successful completion of this course. Sporadic flurries of intense effort are less effective.

(8) Any student who needs special accommodations should notify the instructor within the first week of class.

(9) Please make cell phone be silent during classes and turn off the phone during exams.

(10) The only calculators that students are requested to use on homework/exam are:

- **Casio**: All **fx-115** models. Any Casio calculator must contain **fx-115** in its model name.
- **Hewlett Packard**: The **HP 33s** and **HP 35s** models, but no others.
- **Texas Instruments**: All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name.

Pre-requisite: Fluid Mechanics EGEN 335

Montana Tech
Department of General Engineering

ECIV 5xx/

Course ~~ENGR 5500~~/ECIV 491-02 Hydraulic Structures
https://lipingjiang.wixsite.com/engr5500, Structure (Case Sensitive)

Textbook Urban Hydrology, Hydraulics, and Stormwater Quality: Engineering Application and Computer Modeling
A.Osman Akan and Robert J. Houghtalen 2003, John Wiley & Sons, Inc.

Instructor Dr. Liping Jiang, S&E 304, 406-496-4771, ljiang@mtech.edu

Outcomes Analyze and solve problems in at least four technical areas appropriate to civil engineering via l.2

Objective Analyze and solve problems in technical area 2 (water resources engineering) of Civil Engineering

Office Hours MW 12:00 - 2:00 pm or by appointment (email)

Tentative Schedule

Date	Topics	Chapters
	Introduction	Chap 1
	Design Rainfall	Chap 2
	Rainfall Excess Calculations, Channel Routing	Chap 3,4
Feb 8, 2019	Exam 1	
	Runoff Calculations	Chap 5
	Design of Gutter, Storm Sewer	Chap 6
Mar 15, 2019	Exam 2	
	Design of Culvert, Open-Channel	Chap 6
	Design of Detention Basin and Infiltration Basin	Chap 7
Refer to official final schedule	Final	

Note: 1. Exam 1 covers Chapters 2-4, Exam 2 covers Chapter 5-6, and Final focuses on Chapter 6, 7 but also covers other Chapters

Course grading

Course Grading	Tentative point distribution
Homework	30%
Quiz	5%
Midterms (2)	35%
Final	30%

Score (%)	90 -100	80 - 89	70 -79	60 - 69	<60
Grade	A	B	C	D	F

4XX/5XX course offering

Students will have the option of taking this required course at either the 4XX level or the 5XX level. Expectations for the 500 level course, that are in addition to the 4XX requirements and will deepen individual learning experiences, include the

following:

1) A 20 minute presentation inclusive of in class calculations and out-of class-example problem(s). Student shall choose from a relevant list of topics provided by the instructor, near the start of the term-with presentations begin made by the student(s) at the appropriate time during the semester;

2) Additional reading, homework problems, and Test/Quiz questions, as assigned by the instructor; and,

3) Submission of a 1-page synopsis that addresses a research paper in a peer review journal that is applicable to the course.

Course Policy and Suggestions

(1) All quizzes and examinations will be **closed book** and **no notes** except **one-page summary note**. Necessary equations will be posted on the screen during examinations. **Each student can bring one-page summary note (8.5*11'', writing on one-side, font size no less than 12) that summarizes equations, meanings of equations and symbols, unit conversion, constants, and subjects learned but** NO problem solutions-**May be collected and examined by instructor.** Final grades are non-negotiable.

(2) Three types of homework or practice problems: **(a)** some problems will be graded and **collected on Friday**, and homework may be from other textbook, **(b)** suggested but will not be collected and graded. Some homework problems for (b) option may be part of any exam. **Understanding the assigned problems for (b) is the individual student's responsibility. (c)** in-class quiz

(3) Homework problem format: 1) **GIVEN** (must include all given information) 2) **FIND** (must include what is to be determined 3) **SOLUTION** (neat and orderly solution to the problem in 8.5*11" paper, please stapled all pages) 4) Include a **cover page** (Your name, course number) and assignment sheet(s). If not followed, grades will be adjusted accordingly.

(4) No later or makeup homework will be accepted. There is no makeup in-class homework. If you will miss a quiz/exam due to illness, you need notify me **in advance (before the quiz/exam starts)** by email or call me; otherwise you will not be allowed to make up any quiz/exam. I will make the decision from doctor's permission about making up the exam.

(5) A complete and organized notebook of solved problems is the logical step for examination preparation. Carefully prepare one-page equations for examinations.

(6) The course grade will depend primarily on **problem solving** which **require practice**. Any questions related to specific problems are encouraged during lecture and office hours.

(7) All students are expected to attend every class. It is your responsibility to obtain all information presented in each class missed. When a student has accumulated **six** unexcused class meetings he/she will be recommended for dismissal from the course. On days of poor attendance, surprise quizzes may be given. Class attendance and

methodical effort are important factors for successful completion of this course. Sporadic flurries of intense effort are less effective.

(8) Any student who needs special accommodations should notify the instructor within the first week of class.

(9) Please make cell phone be silent during classes and turn off the phone during exams.

(10) The only calculators that students are requested to use on homework/exam are:

- **Casio**: All **fx-115** models. Any Casio calculator must contain **fx-115** in its model name.
- **Hewlett Packard**: The **HP 33s** and **HP 35s** models, but no others.
- **Texas Instruments**: All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name.

Pre-requisite: ~~ENVE 4020~~ ECIV 4XX OPEN CHANNEL HYDRAULICS

SYLLABUS FOR ECIV 491 for ECIV 4XX Commercial, Industrial, and Residential Building Inspection
Montana Tech

Instructor: Matt Egloff, PE

Meetings: Days and Times T.B.A.

Office, Phone, and Email: S&E-303/ 496-4893 / MEgloff@mtech.edu

Office Hours: M, W, F Days and Times T.B.A.

Texts:
NFPA 70 NEC Handbook
NFPA 1 Fire Code Handbook
NFPA 54 National Fuel Gas Code
ASCE 7-10 Minimum Design Loads for Buildings and Other Structures
International Plumbing Code
International Mechanical Code
International Fuel Gas Code
Materials will be provided by the instructor.

Prerequisite: Civ Eng Plans, Specs&Detailing - ECIV 291 - 02

Performance Outcomes:
This course supports ABET outcomes: a and e.

a. apply knowledge of mathematics, science, and engineering;
e. identify, formulate, and solve engineering problems;

Catalog:
Provides the student with an overview of applicable commercial, industrial, and residential building codes and inspection procedures for electrical, plumbing, sewer, gas, structural, HVAC, and special occupancies. Will also include Montana and some other state specific codes.

Topics:
Safety in the Workplace
Proper Use of Test Equipment
Code development process
Code interpretation
Authority Having Jurisdiction (AHJ)
Grandfathering
Local Codes
Reviewing Documentation: Plans, Utility Bills, Other Records
Electrical: NEC
Fire Safety: Fire Code
Flammable Gas
HVAC
Plumbing
Structural

Grading:
Homework 55%
Tests (3) 45%
Plus minus grading will be used.

Final exam will be comprehensive and mandatory.

Allowed Test & Quiz materials:

1. Only an FE style calculator is allowed for ALL tests and quizzes.
   - HP
     - HP 33s
     - HP 35s
   - Casio
     - All FX-115 models (must have FX-115 in its model name)
   - Texas Instruments
     - All TI-30X models (must have TI-30X in its model name)
     - All TI-36X models (must have TI-36X in its model name)
2. No Cell phones are allowed during tests or quizzes. You may give them to the instructor before the quiz begins. If a cell phone is found in your possession during a test or quiz you will receive a failing grade. Your cell phone will be returned to you upon completion of the test or quiz. We take no responsibility for any cell phones handed in during tests and quizzes and recommend that you not bring them on test & quiz days.
3. You may be assigned seats during tests. We may have tests in a different location. This will be announced in advance if it occurs
4. If you have a question on any test problem, raise your hand and ask the instructor, not another test taker.

Academic Dishonesty (excerpted from the faculty handbook):

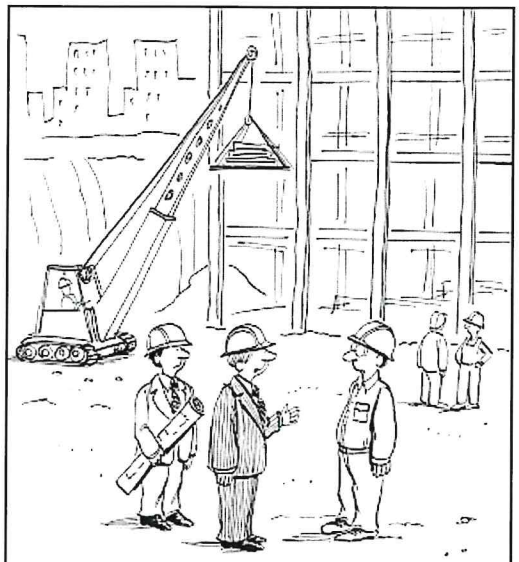
The following will be considered acts of academic dishonesty or cheating:

PLAGIARISM: A student will be considered guilty of academic dishonesty if he/she submits a term paper, essay, speech, laboratory report, or other assignment in which all or part of the words or ideas are copied from the published or unpublished work of another individual without giving the original author proper credit for the words or ideas.
COPYING FROM THE PAPER OF ANOTHER STUDENTS WHILE TAKING AN EXAM: A student will be considered guilty of academic dishonesty if he/she deliberately looks at and copies from another individual's examination paper during an examination.
USING UNLAWFUL AIDS TO PASS AN EXAMINATION: A student will be considered guilty of academic dishonesty if he/she brings to class and uses crib notes electronic devices (e.g. cellphones) books, or any other material to assist him/her in passing the examination unless the instructor of the class has specifically given permission to use such materials.
AIDING ANOTHER STUDENT: A student will be considered guilty of academic dishonesty if he/she willfully assists another student in any act of academic dishonesty. Such a person is as equally guilty as the person plagiarizing or copying.
*If it is determined that a student is deliberately cheating on an examination or a written or oral assignment, he or she should receive a grade of **F** on that examination or assignment as a minimum penalty. The instructor may drop the student from the course with an F grade.*
In reported cases of repeated cheating, the Academic Standards Committee may consider applying additional penalties beyond those imposed by the individual instructors, up to and including expulsion.

If a student witnesses cheating or suspected cheating, this should be reported to the instructor.

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). 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.

Course:	ECIV 4XX Structural Design ECIV 491-04
Schedule:	Tues, Thurs, 8:00 – 9:15 a.m., SE 209
Instructor:	Brian Kukay, bkukay@mtech.edu496-4517, Office: SE 305
Office Hours:	Mon, Tues 11:00-1:00
Text:	Principles of Structural Design Wood, Steel, and Concrete Second Edition, Ram S. Gupta
Focus:	An introduction to structural design.



"We've decided to add forty floors."

Civil Engineering Program Educational Objectives

1. Successfully practice the Civil Engineering profession as demonstrated by :
    a. continued professional employment;
    b. job promotion; and,
    c. expanding career responsibilities.
2. Obtain professional registration.
3. Strongly encourage the completion of an advanced degree.

Student Outcomes:

(c) design a system, component, or process to meet desired needs in context 2 of Civil Engineering that incorporates realistic constraints into the design (C2-Structural Engineering)

(l) analyze and solve problems in at least four technical areas appropriate to civil engineering via l.1, l.2, l.3, and l.4 (L4-Structural Engineering)

Prerequisite: Structures 1

Part 1 Design Loads
Part 2 Analysis and Design of Wood Structures
Part 3 Analysis and Design of Steel Structures
Part 4 Analysis and Design of Reinforced Concrete Structures

Grading: 3 Tests @ 100 points each 300 points possible

Test 1 (2/19)
Test 2 (3/26)
Test 3 (Refer to Finals Exam Schedule for day & time)

A - 270 ↑
B - 240 - 269
C - 210 - 239
D - 180 - 209
F - 179 ↓

You are encouraged to take advantage of the instructor's office hours for help with coursework or anything else connected with the course and your progress.

Lecture Periods.

Lectures for this course will oftentimes be work sessions. Bring your calculator and textbook to class each day and be prepared to participate in classroom discussions. Homework problems and due dates will be announced during class. It is the students' responsibility to keep informed of these assignments.

You must be present for the full lecture period to be eligible to receive credit receive credit for all points earned on that day unless prior arrangements have been made with the instructor.

For days when attendance is taken, your presence counts positively towards the nearest upcoming exam score.

Conversely, missing these days, or a portion thereof, detracts from your nearest upcoming exam score. While there are no specific number of attendances, there will likely be somewhere between 4 to 10 administered over the course of the semester. Students won't be penalized for excused absence(s) that are in accordance with the student handbook, when prior notice is given. Each Attendance is worth 2 test points. Unless prior arrangements have been made in person (and approved by the instructor), students should expect to receive a score of "0" for missed attendance.

For days when in-class quizzes and pop quizzes are administered/collected, or when take home quizzes are administered/collected your presence and submission can count positively towards the nearest upcoming exam score.

Students can expect occasional in-class, pop, and/or take-home quizzes. While there are no specific number of quizzes, there will likely be somewhere between 4 to 10 quizzes administered over the course of the semester. **Honest effort must go into each quiz in order to be eligible to receive credit.** Students must be present in class on these days and submit on time in order to receive credit (as partial and/or complete solutions will be presented thereafter). Each Quiz is worth 2 test points; partial/standardized credit will be awarded. Any points earned counts towards your nearest upcoming exam score. Any points lost detracts from your nearest upcoming exam score. Unless prior arrangements have been made in person (and approved by the instructor), students should expect to receive a score of "0" for missed quizzes.

For days when Homework sets are collected your presence and submission can count positively towards the nearest upcoming exam score.

While there are no specific number of homework sets, there will likely be somewhere between 4 to 10 Homework sets administered over the course of the semester. **Honest effort must go into each assignment in order to be eligible to receive credit**. Each Homework Set is worth 2 test points; partial/standardized credit will be awarded. Points lost detracts from your nearest upcoming exam score. Students must submit their own homework in person and on time in order to be eligible for credit. Homework sets, once scored, will be available for pickup. It is the students' responsibility to keep informed of these problems and to seek out help as needed. Unless prior arrangements have been made in person (and approved by the instructor), students should expect to receive a score of "0" for missed homeworks.

For days when Tests are administered/collected.

Tests are basic components of this course. Accordingly, make-up tests shall be re-administered solely at the discretion of the instructor. In the event no prior arrangements have been made with the instructor, students should expect to receive a score of "0" for missed tests.

*2018-2019 Academic Calendar** (continued)

Second (Spring) Semester 2018 – 2019 ~ Jan. 7, 2019 – May 3, 2019

Fee payment due for Spring semester 2019	Wednesday, January 2, 2019
Late fee ($40.00) for non-paid students without a signed payment contract	Thursday, January 3, 2019
Continuing students (not new admits) registering after fee payment date, assessed a $40 late fee	Thursday, January 3, 2019
New Student Orientation & Registration Program (for students not yet registered)	Friday, January 4, 2019
Residence halls open at 9:00 a.m.	Sunday, January 6, 2019
Spring semester classes begin	Monday, January 7, 2019
Web-registration closes, last day to add a class without instructor approval	Tuesday, January 8, 2019
Instructor signature required to add a class (at the instructor's discretion)	Wednesday, January 9, 2019
***Students without completed fee payment or signed a payment contract by 4:00 pm on Wednesday, January 9th (3rd day of class) will be disenrolled from classes and will be required to re-register. ***	
Registration closes at 4:00 p.m. (10th day of classes - last day to add a class)	Friday, January 18, 2019
Holiday (Martin Luther King Jr. Day) no classes/offices closed	**Monday, January 21, 2019**
Last day to drop a class without class appearing on transcript (15th day of classes)	Monday, January 28, 2019
Non-paid students assessed additional $40.00 late fee	Tuesday, January 29, 2019
Faculty post creshmen and Highlands College grades via OrediggerWeb (20th Day of Class)	Monday, February 4, 2019
Holiday (Presidents Day) no classes/offices closed	**Monday, February 18, 2019**
Faculty post freshmen and Highlands College grades via OrediggerWeb (40th Day of Class)	Tuesday, March 5, 2019
Spring Break begins after last class	**Friday, March 15, 2019**
Spring Break ends (students move back into dorms)	**Sunday, March 24, 2019**
Classes resume at 8:00 a.m.	Monday, March 25, 2019
Last day to withdraw from a class with an automatic "W" (50th day of class)	Tuesday, March 26, 2019
Continuing students begin pre-registration for Summer session and Fall semester 2019	Monday, April 1, 2019
December 2019 graduates – deadline to submit application for degree	Monday, April 8, 2019
Spring Mini-Break - no classes held, admin. & faculty offices open	**Friday, April 19, 2019**
Montana Tech Expo (classes in session)	Thursday, April 25, 2019
Semester exams	Mon-Fri, April 29-May 3, 2019
Commencement – 11:00 a.m. – Butte Civic Center	Saturday, May 4, 2019
Deadline for faculty input of Spring semester final grades via *Orediggerweb* 4:00 p.m.	Wednesday, May 8, 2019
Grades posted to student account/viewable on *Orediggerweb*	Tuesday, May 14, 2019

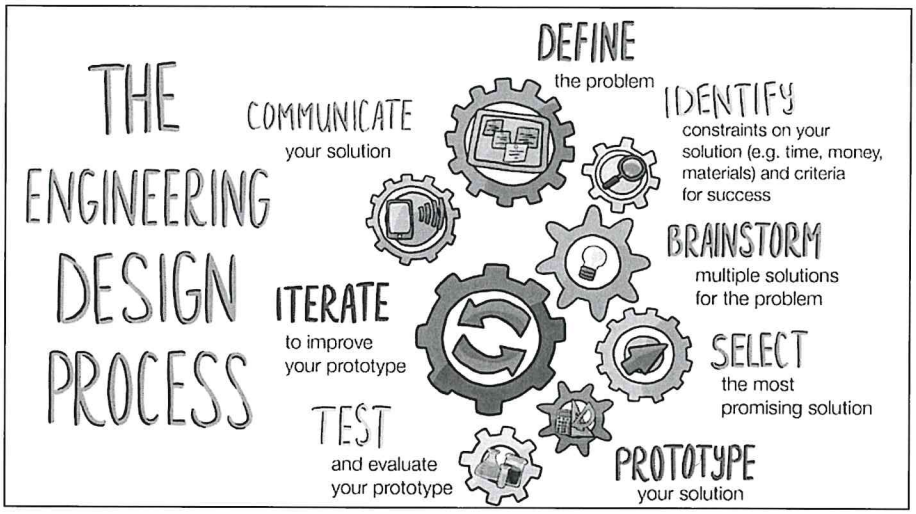
Course: ECIV 4XXW Senior Design for Civil Engineers I (2 cr Fall) and ECIV 4XXW Senior Design for Civil Engineers II (1 cr Spring)
Schedule: Tues, 3:30-5:30, ELC 203
Instructor(s): Kishor Shrestha and Liping Jiang
Office Hours: _____

Text: N.A.

Focus: 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.

Prerequisite for ECIV 4XXW Senior Design for Civil Engineers I: Senior Standing, C. E. Major, Instructors Consent

Prerequisite for ECIV 4XXW Senior Design for Civil Engineers II: ECIV 4XXW Senior Design for Civil Engineers I



Civil Engineering Program Objectives:

1. Successfully practice the Civil Engineering profession as demonstrated by :
    a. continued professional employment;
    b. job promotion; and,
    c. expanding career responsibilities.

3. Strongly encourage the completion of an advanced degree.
4. Continued professional development as demonstrated by:

    a. society membership and participation;
    b. continuing education; and,
    c. engineering related service.

Student Outcomes:

(g) an ability to communicate effectively –via g.2 oral comunication

(m) explain basic concepts in project management, business, public policy, and leadership via m.3 (explain basic concepts in leadership)

Students shall adhere to all policies and regulations called out in the student handbook for this course.

Introduction:

There are a total of four pre-approved projects (A pre-approved project requires both the instructor and the department head consent). These projects were posted during the first week of classes. This year's projects are:

1) A.G.C. project- up to a 6 person team (students will want to identify a single common project to work on for senior design should multiple projects be available).
2) A.S.C.E. wildlife project- 4-5 C.E. student team (students will want to identify a single common project to work on for senior design should multiple projects be available)
3) H.D.R. Industry Project-4-5 C.E. student team
4) Out of Department Project-2 C.E. student team (E.E.'s is included, but there may also be others available)

C.E. students shall have an opportunity to write 2 proposals to apply to a project based on his/her top two choices – while meeting the following conditions. Proposal Options

1) Write a proposal to apply to one pre-approved industry sponsored project and one pre-approved competition based project (A.S.C.E. and A.G.C. are considered competition based projects).
2) or for two ea. pre-approved industry projects.

The instructor and department head will then meet, review the student proposals, and assign up to a 5 or 6 person team of C.E. senior design students to a senior design project for the year. It is hoped that the students will be granted one of their top two choices from the 4 available projects. However, there may be instances where students get assigned to a project that was not in their top two though. These assignments will help ensure that each project will be successful. That said, the theme that C.E. borrowed from others is for the students to treat this as his or her first job not his or her last class.

Note: There could also be a student or two who wishes to work on a project from another dept. (with the instructor and Department head approval), this can be considered as well- presuming that there are credits available through another dept.

Once students are assigned to his or her respective team, the next step will be to schedule a kickoff meeting with the project points of contact. Each team will want to appoint a team captain and team co-captains. Team captains will then coordinate with the instructor and project-point-of-contact to arrange for a kickoff meeting. The kickoff meetings will entail either a conference call, a face to face meeting, or a skype session with the student teams for a given project, and possibly 1 ea. 30-50 minute conference call with the student team. Once the projects are underway, the project-points of contact can be available to answer a question or two from students along the way and at various checkpoints (be them every other week, monthly, or as tasks are completed) to ensure that the projects stay on track through the end of the fall semester (2cr).

Upon registering for senior deign in the spring semester(1 cr), work will entail picking up where the fall semester left off. As the end of the semester nears, all projects will culminate with the submission of a written technical report, and a poster presentation made at end-of-year during Techxpo. The campus and community, and the project-points-of-contact shall all be invited to attend.

Lecture Periods.

As the projects get underway, lectures for this course will oftentimes be work sessions. Bring your calculator and textbook to class each day and be prepared to participate in classroom discussions. Homework problems and due dates will be announced during class. It is the students' responsibility to keep informed of these assignments.

You must be present for the full lecture period to be eligible to receive credit receive credit for all points earned on that day unless prior arrangements have been made with the instructor.

For days when attendance is taken, your presence counts positively towards your end of term score.

For days when your time logs, and work reviewed are completed, your submissions can count positively towards your end of term score

For days when memos, project presentations are required your presence and submission can count positively towards your end of term score.

For days when reports are collected your presence and submission can count positively towards your end of term score.

Grading (Fall term):

Project-Point-of Contact Evaluation (100 pts)
Instructor Evaluation (100 pts)
Attendance,Memos, Project Presentations, Reports, timelogs (100 pt)

300 points possible

A - 270 ↑
B - 240 - 269
C - 210 - 239
D - 180 - 209
F - 179 ↓

Academic Dishonesty:

The policy given in the student handbook will be strictly enforced.

Learning Disabilities:

Students with disabilities who believe they may need accommodations in this class should contact the Montana Tech Disability Services Coordinator.

Important Note:

The instructor reserves the right to modify the contents of the course syllabus and schedule due to unforeseen circumstances and to better accommodate the student needs.

Final Remark:

Structural Engineering is an exciting topic. I hope you enjoy this class and learn something useful for your future career. You are always welcome to discuss with me your suggestions or concerns. Good luck to all of you in this class!

SYLLABUS FOR ECIV 491 for ECIV 4XX F.E. Review for Civil Engineers
Montana Tech-Civil Engineering

Instructor: Civil Engineering Faculty

Meetings: This course is administered similar to a student internship.

Office Hours: M, W, F Days and Times T.B.A.

Required Texts:
FE Civil Review, Lindeburg
ISBN: 978-1-59126-529-0
and

FE Civil Practice, Lindeburg
ISBN: 978-1-59126-530-6

Pre-requisite: Civil Engineering Major, Senior Standing, and consent of instructor

Performance Outcomes:
Completion of the FE-Civil course supports ABET outcomes: a,b,c,f, h, and l.

Catalog:
Provides the student with guided self-study and national exam preparation though a comprehensive review of topics that are pertinent to the F.E.-Civil Exam.

Programming:

Civil EngineeringStudents shall complete 400 problems out of the F.E. Civil Practice Book by Lindeburg, and catalog them, by chapter in a three ring binder. The three ring binder of 400 ea. completed problems will then be submitted to the instructor, in person, to becoming eligible to register for the class. Students are strongly encouraged to complete these problems during the summer months preceding his or her senior year.

Senior standing, Civil Engineering Students shall register for the "F.E. review for Civil Engineers" class in the semester that he or she registers for, and takes, the F.E. exam; be that the fall semester or spring semester of his or her Senior Year. Students shall then furnish proof of taking and/or passing the exam to the instructor before finals week starts, in fulfillment of the course requirements.

FE exam results are typically available 7–10 days after you take the exam. You will receive an email notification from NCEES with instructions to view your results in your MyNCEES account. Results include information specific to your licensing board regarding how you should proceed based on your performance.

A $175 exam fee is payable directly to NCEES. Some licensing boards may require you to file a separate application and pay an application fee as part of the approval process to qualify you for a seat for an NCEES exam. Your licensing board may have additional requirements. Special accommodations are available for examinees who meet

About the FE-Civil exam https://ncees.org/engineering/fe/

The Fundamentals of Engineering (FE-Civil) exam is generally your first step in the process to becoming a professional licensed engineer (P.E.). It is designed for recent graduates and students who are close to finishing an undergraduate engineering degree from an EAC/ABET-accredited program. The FE-Civil exam is a computer-based exam administered year-round at NCEES-approved Pearson VUE test centers.

The FE-Civil exam includes 110-questions. The exam appointment time is 6 hours long and includes

- Nondisclosure agreement (2 minutes)
- Tutorial (8 minutes)

- Exam (5 hours and 20 minutes)
- Scheduled break (25 minutes)

Learn more at the NCEES YouTube channel.

Register for an FE-Civil exam by logging in to your MyNCEES account and following the onscreen instructions. Prepare for the FE-Civil exam by

- Reviewing the FE exam specifications, fees, and requirements
- Reading the reference materials
- Understanding scoring and reporting
- Viewing the most up-to-date FE exam pass rates

A $175 exam fee is payable directly to NCEES. Some licensing boards may require you to file a separate application and pay an application fee as part of the approval process to qualify you for a seat for an NCEES exam. Your licensing board may have additional requirements. Special accommodations are available for examinees who meet certain eligibility criteria and sufficiently document their request.

Grading: Students who furnished required problems and proof of passing the exam by the required date = A.

Students who furnished required problems and proof of sitting for the FE-Civil exam by the required date = C.

Students who furnished required problems but no proof of sitting for the FE-Civil exam by the required date = F.

Students who did not furnish required problems nor proof of sitting for the FE-Civil exam by the required date = F.

Additional information…

Pass rates

The pass rates below represent July/August/September and October/November/December 2017 FE examinees who

- Took the FE exam for the first time
- Attended EAC/ABET-accredited engineering programs
- Took the FE exam within 12 months of graduation

Exam	Volume	Pass rate
FE Chemical	592	70%
FE Civil	3,321	68%
FE Electrical and Computer	897	70%
FE Environmental	379	78%
FE Industrial and Systems	110	72%
FE Mechanical	2,512	80%
FE Other Disciplines	640	81%

https://ncees.org/engineering/fe/

C.E.'s CRC Request for 2019-202 Catalog
Kukay, Brian
Hartline, Beverly;Trudnowski, Dan;Dickerson, Leslie - Enrollment Services
Sent Items
Sounds good, I agree.

Many Thanks Bev.

Brian
Hartline, Beverly
Today, 11:41 AM
Brian,

The grad council does not need to review this request.

If Liping's course is new (not previously approved), GC would need to review it. However, I think we did that a year ago or so.

B

BEVERLY HARTLINE, PH.D.
VC Research & Grad School

OFFICE PHONE (406) 496-4456

Kukay, Brian
Hi Bev:

Thanks for your e-mail.

Liping has a dual listed course that was approved and built into the 2018-2019 Catalog. You helped us modify the syllabus to capture the dual listing. It is for Hydraulic Structures.

All things are the same here, except that we are doing common course numbering for this class, and the pre req is her open channel hydraulics course.

I included you on this just to be safe.

Your thoughts?

Many Thanks Bev,

Brian
Hartline, Beverly
Today, 11:32 AM

Hi Brian, does this CRC request have any grad school aspects? It doesn't look like it to me. If it does not, then I would not normally be copied and it would not need to be considered by the graduate council.

Please confirm. I do not want to fail to discuss it at GC tomorrow, if it needs to be reviewed there.

Bev

Sent from my iPhone

> On 10 Apr 2019, at 11:13, Kukay, Brian <BKukay@mtech.edu> wrote:
>
> Hi Dan, Bev, and Leslie,
>
>
> Please see attached. I can bring hard copies by.
>
>
> With appreciation,
>
>
> Brian
> <CE CRC Request Form 2019 2020.pdf>

MontanaTech

Curriculum Change Request Form Dated 6 September 2018

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 changed to the catalog require CRC approval.

Meetings are Thu, by COB Monday, forward the completed form along with supporting information to the CRC chair after approval from the department chair, dean, and graduate council if necessary. Please email a word file and remember to check the request level found on the signature page. The signature page can be a PDF or bring the original with signatures to the meeting and state in the email that you are doing so.

New courses require course objectives. Please contact the registrar before submitting a CRC request for a new course to evaluate the use of the common course numbering system. If numbers are pending, it is acceptable to use the XX notation. OSH 2XX

Final changes are made by the registrar after senate approval.

Guidance can be found: https://www.umt.edu/provost/faculty/curriculum/default.php.

Student ID:_____
Student Name:_____
Adviser Name:_____

Catalog: 2019-2020 Catalog
Program: Civil Engineering, B.S.
Minimum Credits Required:_____

Civil Engineering, B.S.

Freshman

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
CHMY 141 - College Chemistry I	3 credits			
CHMY 142 - College Chemistry Laboratory I	1 credit			
EGEN 101 - Introduction Engineering Calculations & Problem Solving	3 credits			
M 171 - Calculus I	3 credits			
Humanities Elective 3 credits				
EGEN 194 - Freshman Engineering Seminar	1 credit			
WRIT 121 - Introduction To Technical Writing	3 credits			
-OR-				
WRIT 101 - College Writing I	3 credits			

Total: 17

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
M 172 - Calculus II	3 credits			
PHSX 234 - General Physics-Mechanics	3 credits			
Humanities Elective 3 credits				
CHMY 143 - College Chemistry II	3 credits			
-OR-				
OSH 2246 - Safety and Health Occupations and Programs	3 credits			
-OR-				
OSH 2266 - Safety Engineering & Technology	3 credits			
GEO 101 - Introduction to Physical Geology	3 credits			
-OR-				
BIOE 185 - Environmental & Ecological Issues	3 credits			

Total: 15

Sophomore

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
EGEN 201 - Engineering Mechanics–Statics	3 credits			
M 273 - Multivariable Calculus	4 credits			
PHSX 235 - General Physics-Heat, Sound & Optics	3 credits			
PHSX 236 - General Phy-Heat, Sound & Optics Lab	1 credit			
ECIV 215 - Introduction to Modeling for Civil Engineers	1 credit			
ECIV 208 - Construction Contracts and Introduction to Construction Engineering	3 credits			
ECNS 201 - Principles of Microeconomics	3 credits			
-OR-				
ECNS 202 - Principles of Macroeconomics	3 credits			
-OR-				
ECNS 203 - Principles of Micro and Macro	3 credits			

Total: 18

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
EGEN 202 - Engineering Mech–Dynamics	*3 credits*			
M 274 - Introduction to Differential Equation	*3 credits*			
PHSX 237 - General Physics-Electricity, Magnetism & Motion	*3 credits*			
ECIV 225 Civil Engineering Plans Details and Specs *3 credits*				
EGEN 305 - Mechanics of Materials (equiv 205)	*3 credits*			
~~ECIV 304 - Construction Means and Methods~~	~~*3 credits*~~			
~~-OR-~~				
ECIV 307 - Construction Bidding and Estimating	*3 credits*			

Total: 18

Junior

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
WRIT 321W - Advanced Technical Writing	*3 credits*			
ECIV 312 - Structures I	*3 credits*			
EGEN 325 - Engineering Economic Analysis	*3 credits*			
ECIV 407 Building Inspections *3 credits*				
MIN 210 - Plane Surveying	*3 credits*			

Total: 15

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
EGEN 306 - Mechanics of Materials Laboratory	*1 credit*			
STAT 332 - Statistics for Scientists and Engineers	*3 credits*			
EGEN 335 - Fluid Mechanics	*3 credits*			
EGEN 336 - Fluid Mechanics Lab	*1 credit*			
ECIV 350 - Transportation Engineering	*3 credits*			
ECIV 440 Structural Design *3 credits*				

Total: 14

Senior

Fall Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
ECIV 302 Temporary Structures *3 credits*				
ECIV 486 - Soil Mechanics & Foundation Design	*3 credits*			
ECIV 431 Open Channel Hydraulics *3 credits* ECIV 458 F.E. Review for Civil Engineers *1 credit* Free Elective *3 credits* ECIV 489W ' Senior Design for Civil Engineers *2 credits*				

Total: 15

Spring Semester

Course Name	Credits	Term Taken	Grade	Gen Ed
ECIV 405 - Construction Project Planning and Scheduling (Or ECIV 505)	*3 credits*			
ECIV 443 Hydraulic Structures *3 credits* ECIV 402 Sustainable Engineering *3 credits* Professional Elective *3 credits** Social Science Elective *3 credits* ECIV 499W Senior Design for Civil Engineers *1 credit*				

Total: 16

Minimum credits for a B.S. degree in Civil Engineering: 128

Notes:

* 3 Professional Elective credits required. Approved Professional Electives inlcude: EENV 402 Surface Water Hydrology 3 cr., OSH 3246 Construction Safety 3 cr., ECIV 487 Soil Mechanics and Foundations Lab 1 cr. , ~~ECIV 491 Fundamentals of Pavement Design 3 cr.~~, Internship (Must be of junior or senior standing, 1 cr., 1 time only.

Notes:

"Additional courses that are offered by the Civil Engineering Department at the 300 level or higher may be used as a professional elective where not required elsewhere in the 128 credit curriculum."

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date 09/07/18
Dept. Geophysical Engineering College SME
Program Geoscience/Geophysical Engineering CRC Representative Marv Speece

Description of Request: Change the name of GEOP 425/525 Advanced Remote Sensing to Remote Sensing for the Earth Sciences. Update course description and course outcomes.

Current Course or Program Information: GEOP 4XX/5XX Advanced Remote Sensing, 3 (2 Lec. 3 Lab.), PHYS 237 General Physics-Electricity, Magnetism & Motion

Course Description:
Emphasis on remote sensing physical principles, imaging principles and systems, satellite image processing, interpretation of remotely sensed data, and integration of remote sensing with GIS. Remote sensing applications to geophysics, geology, hydrology, forestry, agriculture, mineral and oil exploration, natural hazards monitoring (earthquakes, volcanoes, droughts and floods, landslides and land subsidence, wild forest fires), and land and resource management.

Outcomes:

1. To understand the remote sensing physical principles, imaging principles and systems;
2. To have the skills in satellite image processing, interpretation of remotely sensed data, and integrating remote sensing with GIS;
3. To apply remote sensing and image processing techniques to geophysics, geology, hydrology, forestry, agriculture, mineral and oil exploration, natural hazards monitoring (earthquakes, volcanoes, droughts and floods, landslides and land subsidence, wild forest fires), and land and resource management.

Proposed Change

Course # Name	Credits	Pre-req.
GEOP 425/525 Remote Sensing for the Earth Sciences	3 (2 Lec. 3 Lab.)	PHYS 237, General Physics-Electricity, Magnetism & Motion, or permission of instructor.

Course Description:
This course emphasizes remote sensing principles including applications to electromagnetism (EM), aero-gravity, and aero-magnetism. Air- and space-borne imaging principles and imaging systems (optical, thermal, radar, and lidar) for Earth sciences will be emphasized. Interpretation of remotely sensed EM data, aero-gravity and aeromagnetic data using state-of-the-art software such as MATLAB, ERDAS Imagine, and Oasis montaj will be covered, along with applications to geophysics, geology, hydrology, mineral and oil exploration, and natural hazards assessment and monitoring (earthquakes, volcanoes, landslides and land subsidence, etc.).

Outcomes:
1. To understand the remote sensing physical principles in electromagnetism (EM), aero-gravity, and aero-magnetism
2. To understand air- and space-borne imaging principles and systems for earth sciences
3. To acquire the skills in satellite remote sensing data processing and interpretation using state-of-the-art software

4. To be able to apply remote sensing and image processing skills to projects in hydrology, geology, mineral and oil exploration, and natural hazards assessment and monitoring (earthquakes, volcanoes, landslides and land subsidence, etc.)

List of supporting documentation attached:
Syllabus

Assessment Leading to Request
These modifications are the result of the common course numbering review. We made these changes to avoid a geography course designation.

Anticipated Impacts to "Other" Programs
None. This course can be an elective for other MS and ME programs.

Impact on Library: Marv Speece has consulted with Scott Juskiewicz (09/18/18) at the Montana Tech library to ensure needed materials and media are available.

Date to take effect: ASAP

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ Date 4-10-19

Dean Approval _____ Date 4-10-19

Graduate Council Approval _____ Date 4-11-19

CRC Approval _____ Date 4-18-19

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☑ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

GEOP 425/525: *Remote Sensing for the Earth Sciences*

3 credits Fall 2019

Lecture: T/R 10:00 am-10:50 am in ELC 329
Lab: R 2:00 pm-5:00 pm in ELC 315A
Instructor: Dr Xiaobing Zhou, Email: xzhou@mtech.edu, Tel: 496-4350
Office Hours: M/W/F 11:00 -12:00pm, ELC 304

Textbooks:

Sabins, F. F., 2007. Remote Sensing: Principles and Interpretation, 3rd Ed., published by Waveland Press Inc., Long Grove, Illinois, (required).

Kang-tsung (Karl) Chang, 2010. Introduction to Geographic Information Systems with Data Files CD-ROM, 5th Ed., published by McGraw Hill Higher Education. (not required)

References (recommended):

Victor Mesev, 2008. Integration of GIS and Remote Sensing, John Wiley & Sons, ISBN 0470864095.

Jensen, J. R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective, Prentice Hall, ISBN-10: 0131889508; ISBN-13: 9780131889507.

Lillesand, T. M., R. W. Kiefer, J. W. Chipman, 2004. Remote Sensing and Image Interpretation, 5th Edition. John Wiley & Sons, Inc., New York.

Rees, W. G., 2001. Physical Principles of Remote Sensing, 2nd Ed., Cambridge University Press.Cambridge, UK.

Jensen, J. R., 1996. Introductory Digital Image Processing: A Remote Sensing Perspective, 2nd Ed., Prentice Hall, New Jersey.

Campbell, J. B., 2002. Introduction to Remote Sensing, 3rd Ed., Guilford Press, New York.

USGS Earthshots: http://earthshots.usgs.gov/earthshots/about.

Prerequisites:

PHSX 237 (Electricity, Magnetism, and Wave Motion) or permission of instructor

Course Description:

This course emphasizes remote sensing principles including applications to electromagnetism (EM), aero-gravity, and aero-magnetism. Air- and space-borne imaging principles and imaging systems (optical, thermal, radar, and lidar) for Earth sciences will be emphasized. Interpretation of remotely sensed EM data, aero-gravity and aeromagnetic data using state-of-the-art software such as MATLAB, ERDAS Imagine, and Oasis montaj will be covered, along with applications to geophysics, geology, hydrology, mineral and oil exploration, and natural hazards assessment and monitoring (earthquakes, volcanoes, landslides and land subsidence, etc.). A brief introduction of GIS will be given from the application point of view so that the integration of remote sensing and GIS can be accomplished. Students who sign GEOP 425 must take a final exam. All students who sign GEOP 525 need to summarize literature (references) readings on the topics covered by lectures as weekly homework and must complete a project, submit a project report, and present results. Students **may not** take both GEOP 425 and GEOP 525 for credit.

Homework:

Homework will generally be assigned on Tuesday and due the following Tuesday; otherwise, just follow the announcement in classes or the specified date on the homework sheet. Group discussing in doing homework is permitted but copying answers from others or any other resource including copy and paste from internet is prohibited. Copied homework will be graded as "zero" or "F". Both sides will be graded "F" if answer is copied from other students in class because nobody knows who copies whose – thus do not let anybody copy your homework or copy and paste from internet. No homework will be dropped in calculating your course grade. **Late homework will not be accepted**. Not all questions in each homework assignment will be graded. Graded questions in each homework assignment will total 100 pts.

Outcomes:

1. To understand the remote sensing physical principles in electromagnetism (EM), aero-gravity, and aero-magnetism
2. To understand air- and space-borne imaging principles and systems for earth sciences
3. To acquire the skills in satellite remote sensing data processing and interpretation using state-of-the-art software
4. To be able to apply remote sensing and image processing skills to projects in hydrology, geology, mineral and oil exploration, and natural hazards assessment and monitoring (earthquakes, volcanoes, landslides and land subsidence, etc.)

Exams: There will be one mid-term exam.

Grade Policy:

The final grade of the course will be determined approximately as follows:
Homework: 20%
Lab: 20%
Midterm exam: 25%
Project/Final (35%)
The instructor reserves the right to give extra credit to active participation and demonstrated interest and capability. Grading scale observes: A=(92,100], A-=[90, 92], B+=(87, 90), B=[83, 87], B-=[80, 83), C+=(77, 80), C=[73, 77], C-=[70, 73), D+=(67, 70), D=[63, 67], D-=[60, 63), F=[0, 60). [or] means inclusive, (or) means exclusive. Also: A= 4.0, A-=3.7, B+=3.3, B=3.0, B-=2.7, C+=2.3, C=2.0, C-=1.7, D+=1.3, D=1.0, D-=0.7, F=0. Students registered for GEOP425 must take a final exam. Students registered for GEOP 525 must do a project.

Course documents:

All electronic course documents (syllabus, homework assignments, class notes, references, etc.) will be uploaded on the Moodle under the "GEOP425/525 Documents" directory.

Academic Dishonesty:

1. For homework, exams, and project, it is your responsibility to make sure your answers and method used and conclusions are correct. Oversight of examiner, instructor, or grader so that you get credit for a wrong answer does not mean that the answer is correct.
2. Copying answers to homework and exam questions from other students' or any other resource is plagiarism. The guidelines on "Academic Dishonesty" section of the 2016-2017 Catalog are in effect for this course.

Requirement:

1. Reading the assigned material listed in the schedule before class is expected.
2. Attendance of each class is mandatory. **Talking with other students in class is prohibited and is considered disruptive**. The relationship between your final grade of the course and active class attendance should be obvious.

Tentative schedule:

Introduction to remote sensing (1 week)
Electromagnetic radiation-material interaction (2 weeks)
Atmospheric effects (1 week)
Spectral signature (1 week)
Multiple spectral remote sensing and applications (1.5 weeks)
Imaging systems (1.5 weeks)
Satellite platforms (1 week)
Image processing (2 weeks)
Hyperspectral remote sensing and applications (1 week)
Radar remote sensing and applications (2 weeks)
Introduction using GIS and spatial analysis (1 week)

Final/project due: Friday, December 7, 2018 (last of class). Project report must be submitted electronically (Word file or PDF file) to xzhou@mtech.edu by 5:00PM, 12/10/2018.

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date 04/14/19
Dept. M&ME **College** SME
Program BS **CRC Representative Dr. Avimanyu Das**

Description of Request: Curricular changes that reduce the total credits for graduation from 136 to 128 credits: (1) drop 2 courses at 3 credits each, (2) drop 5 credits of technical electives, and (3) add new course (syllabus attached) at 3 credits. This is a net change of -8 credits. Other changes include (4) requiring a humanities/fine arts course, (5) moving 3 courses from one semester to another, and (6) eliminating the tracks.

Current Course or Program Information: The current M&ME Program requires 136 credits to graduate and allows students, if they want, to choose a track in either Mineral Processing/Extractive Metallurgy or Materials Processing/Physical Metallurgy in which they choose a minimum of 4 courses among a list of 9 courses.

Proposed Change

Course #	Name	Credits	Pre-req.	Action
BGEN 363	Business Ethics and Decision Making	3cr	None	Require as a Humanities/Fine Arts Elective
Elective	Social Science	3cr	Var	Move from Senior Fall to Sophomore Fall
EMAT 362	Ceramic Materials	3cr	EMAT 351	Move from Senior Fall to Junior Spring
EGEN 325	Engineering Economic Analysis	3cr	Junior-standing	Move from Junior Spring to Senior Fall
Elective	Science or Technical or Track (4 times)	12cr	Var	Change to Science or Technical (and Eliminate Tracks)
Elective	Science or Technical or Track (2 times)	5cr	Var	Drop
EMET 340	Mass Transfer & Chemical Kinetics	3cr	CHMY 143; M 273	Drop
EMET 350	Transport Phenomena	3cr	M 172; PHSX 235	Drop
EMET 430	Reactor Design	3cr	CHMY 143/M 273	Create and Add to Program (see attached syllabus)

Course Objectives: Students completing this course will have the ability to:
- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- Acquire and apply new knowledge as needed, using appropriate learning strategies
- Integrate the understanding of the scientific and engineering principles underlying the four major elements of the field: structure, properties, processing, and performance related to metallurgical and materials systems appropriate to the field.

COURSE CATALOG (see attached changes that reflect the new verbage needed to address the actions above)

List of supporting documentation attached:

1. EMET 430 Syllabus (ABET style including course objectives)
2. Curriculum (Current vs Proposed) to show what the changes are
3. Course Catalog changes to show what students need to do to graduate under the revised program

Assessment Leading to Request

All of these changes are the result of Program Prioritization and were discussed at numerous Dept Meetings since Fall 2018 Semester when Program Prioritization recommendations were first announced. The most important is dropping the graduation requirements from 136 to 128 credits to bring us in line with similar programs at UT (130.5), UNR (130), SDSM&T (130), MS&T (128) and CSM (138.5) as well as at MSU-Bozeman per MechE (128), CivE (128), ChemE (128) and EE (125). To do this, 5 credits of technical electives and 6 credits of courses are dropped along with the tracks. Some of the content of the two courses are retained and used to create EMET 430 similar to what CSM does. Requiring BGEN 363 will further increase ethics awareness and their criticality in making business decisions in today's world as needed for tomorrow's leaders. Mining Engineering and Business Departments strongly encourage requiring this course. The courses being moved are expected to be offered every other year in order to address decreased faculty numbers due to inability to replace Gleason (retirement) and Huang (1/3-retirement). Meetings with individual students and later with Club Met were fruitful. Students voted unanimously in favor.

Anticipated Impacts to "Other" Programs

Requiring BGEN 363 will increase enrollments in the course; however, at least initially, the numbers will not be significant per current M&ME enrollments; nevertheless, it is welcomed by the Business Department. It is anticipated that applications for minors, double majors, and graduate majors will increase because it is fairly common for M&ME students to pursue these. Thus, enrollment in courses across the campus will increase but will also be minimal. Promotion of our graduate programs should increase enrollments in Graduate School. There are no other impacts anticipated on other programs.

Impact on Library: Dr. Courtney Young has consulted with Scott Juskiewicz (04/15/19) 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: 08/15/19

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ **Date** _____

Dean Approval _____ **Date** _____

Graduate Council Approval _____ Date _____

CRC Approval JA 4-18-19 Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ✓ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ✓ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ✓ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

Table 5-1 Curriculum (ABET table is modified for CRC)

Metallurgical & Materials Engineering (Proposed Program)

M&ME students are required to do 6 credits of EMET/EMAT courses and 6 credits of science and/or engineering courses including additional EMET/EMAT courses. This example shows 6 in EMET/EMAT and 6 in science. However, ranges at the bottom of each category illustrate minimum credits in Math+Basic Sciences as well as in Engineering Topics are satisfied (which, in this case, are at least +4 and +25 in excess, respectively).

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.	Indicate Required (R), Elective (E) Selected Elective (SE)	*Subject Area (Credit Hours)*			Semester Total	Cumulative Semester Total
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	Other		
Freshman Fall Semester						
CHMY 141 College Chemistry I	R	3				
CHMY 142 College Chemistry Lab I	R	1				
EGEN 101 Intro to Engr I	R		*3*			
EGEN 194 Freshmen Engineering Seminar	R		*1*			
M 171 Calculus I	R	3				
WRIT 121* College Writing I	R			*3*		
Humanities/Fine Arts**	E			*3*		
Freshman Spring Semester		*7*	*4*	*6*	*17*	*17*
CHMY 143 College Chemistry II	R	3				
CHMY 144 College Chemistry Lab II	R	1				
EMET 232 Introduction to Mineral Processing	R		*2*			
EMET 234 Mineral Processing Lab	R		*1*			
EMET 194 M&ME Workshop	R		*1*			
M 172 Calculus II	R	3				
PHSX 234 General Physics – Mechanics	R	3				
Social Science** Elective	E			*3*		

Sophomore Fall Semester		10	4	3	17	34
ECNS 203# Principles of Economics	R			3		
EGEN 201 Engineering Mechanics-Statics	R		3			
M 273 Multivariable Calculus	R	4				
PHSX 235 General Phys-Heat, Sound, & Op	R	3				
PHSX 236 Phys Lab - Heat, Sound & Optics	R	1				
EMET 233 Mineral Processing and Design	R		2			
EMET 235 Mineral Proc & Extractive Met Lab	R		1			
Sophomore Spring Semester		7	3	3	17	51
EMAT 251 Materials Structures & Properties	R		3			
EMET 307 M&ME Thermodynamics	R		3			
M 274 Intro to Differential Equations	R	3				
PHSX 237 Gen. Phys.-Ele, Magn, & Motion	R	3				
PHSX 238 Gen. Phys - Ele, Magn & Motion Lab	R	1				
EGEN 305/306 Mechanics of Materials/Lab OR EGEN 325/326 Fluid Mechanics/Lab	SE		4			
Junior Fall Semester		7	10	0	17	68
EMET 401 Hydrometallurgy & Aqueous Processing	R		3			
EMET 402 Pyrometallurgy and Thermal Processing	R		3			
EMET 405 Extractive Metallurgy Lab	R		1			
EMAT 351 Fundamentals of Materials	R		3			
EMAT 353 Microstructural Interpretation	R		1			
STAT 332 Statistics for Scientists & Engineers	R	3				
Elective^ Science or Technical	SE in M&ME		3			
Junior Spring Semester		3	14	0	17	85
WRIT 321 Advanced Technical Writing	R			3		
EMAT 362 Ceramic Materials	R		3			
EMAT 354 Mat. & Phys. Metallurgy Lab	R		1			
EMET 380 M&ME Safety & Health	R		1			
EMAT 471 Materials Characterization & Analysis	R		3			
EMET 425 M&ME Computer Applications	R		3			
Elective^ Science or Technical	SE in M&ME		3			

Senior Fall Semester^^		0	*14*	*3*	*17*	*102*
EGEN 325 Engineering Economics and Analysis	R		*3*			
BGEN 363## Business Ethics and Decision Making	R			*3*		
EMAT 475 Corrosion	R		*3*			
EMET 489W M&ME Design I	R		*1*			
Elective^ Science or Technical	SE	3				
Senior Spring Semester^^		3	*7*	*3*	*13*	*115*
EMET 430 Reactor Design	R		*3*			
EMAT 472 Materials Engineering & Design	R		*2*			
EMET 451 Process Instrumentation & Control	R		*3*			
EMET 499W Capstone: M&ME Design II	R		*2*			
Elective^ Science or Technical	SE	3				
Add rows as needed to show all courses in the curriculum.		3	*10*	*0*	*13*	*128*
TOTALS (in terms of semester credit hours)		34-40	*76-70*	*18*		
Total must satisfy minumum credit hours	Minimum Semester Credit Hours	30 Hours	45 Hours			

1. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date 4/5/19
Dept. Mining Engineering
Program Mineral Economics – Mining Engineering

College SME
CRC Representative Paul Conrad

Description of Request: MS in Mineral Economics was discontinued long ago, however several of the courses have continued to be taught and we have planned on including more in our M.Eng in Mining. Engineering Economics moved to EGEN several years ago and the Registrar's office has recently moved M.Ec. 4000 & 4030 to Mining. This request is to move most of the remaining Mineral Economics courses to the Mining Department to clean up the catalog. Several courses are not likely to be taught and are recommended to be dropped from the catalog.

Current Course or Program Information: See Attached Sheet

Proposed Change

Course # Name	Credits	Pre-req.
The attached sheet lists the individual courses with their descriptions which will remain unchanged. Course numbers will remain unchanged except for removing the forth digit. Remove classes		
This should include what will appear in the catalog, exactly. New course require course objectives listed in this area.		

4010 4040
4020
5100 5010

List of supporting documentation attached:

1. List of courses

Assessment Leading to Request

A separate graduate program in Mineral Economics is not desired, however many of our students do wish to further their knowledge of Mineral Economics and this is a key component of our anticipated Master of Engineering degree.

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: 5/1/19

Montana Tech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ Date 4/5/19

Dean Approval _____ Date 4-5-19

Graduate Council Approval ok on web Date 4-15-19

CRC Approval _____ Date 4-18-19

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☒ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

Already Moved: M.Ec 4000 & M.Ec 403

To be Dropped from Catalog: M.Ec 4010, 4020, 4040, 5010, 5100 (already exists as a MIN class)

M.Ec 4100 – Minerals & Economic Development
MIN 410 – Minerals & Economic Development

Applies basic economic principles to examining the role of minerals in the economies of various nations, particularly the LDC's. Market structures, mineral ownership and tax policies and development objectives are studied.

M.Ec 5000 – Advanced Studies in Mineral Economics
MIN 500 – Advanced Studies in Mineral Economics

Economic studies of selected mineral commodities and related policy issues. Intended to allow advanced students the opportunity to pursue topics of particular interest, under guidance, but emphasizing self-initiative.

M.Ec 5020 – Mineral Forecasting & Econometrics
MIN 502 – Mineral Forecasting & Econometrics

Examines the techniques commonly used in forecasting the supply, demand and price of mineral commodities, such as least-squares regressions, moving averages, curve smoothing, etc. Covers econometric techniques such as multiple regression and simultaneous equation models, and key factors such as auto-correlation, multicolinearity, lagged variables, and hypothesis testing.

M.Ec 5030 – International Mineral Economics
MIN 503 – International Mineral Economics

Examines the theory of international trade, growth and constraints of trade, economic integration, national accounting for balance of trade, foreign exchange and international monetary arrangements. Case studies and illustrative examples are drawn from the mineral industries.

M.Ec 5040 – Mineral Resource Economics
MIN 504 – Mineral Resource Economics

This course deals with static and dynamic theories of depletion, long and short term benefits and costs to society of mineral exploitation, and the formulation of long run costs and prices.

M.Ec 5050 – Mineral Policy & Taxation
MIN 505 – Mineral Policy & Taxation

This course examines the formulation and implementation of policies towards mineral exploration, production, exports and imports. Mineral structures, including the Added Profits Tax, and their impacts are examined. Examples are drawn from the Less Developed Countries (LDC's), industrialized nations, and selected States.

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date 03/24/19
Dept. Safety, Health and Industrial Hygiene
Program B.S. OSH

College School of Mines and Engineering
CRC Representative Theresa Stack

Description of Request:
Update course description.

Proposed Changes in Yellow

OSH 226 - Safety Engineering & Technology

3 credits (Hrs: 3 Lec.)

Introduces system safety and safety engineering principles applied to control of hazards associated with facility layout and security, hot work, industrial trucks, cranes and rigging, ~~chemical processes~~, materials handling, control of hazardous energy, machine operation, MSHA machine guarding standard, ~~and~~ electrical compliance and working at heights. Covers 29 CFR 1910 General Industry Standards.

~~(OSH 2256 does not meet the requirement and cannot substitute for OSH 2266). Course generally offered 2nd semester.~~

List of supporting documentation attached:
1. none

Assessment Leading to Request
Update course description and remove errors.

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: 2019 catalogue

MontanaTech

Curriculum Change Request Form Dated 6 September 2018

APPROVALS

Department Head Approval _____ Date 4-16-19

Dean Approval _____ Date 4-16-19

Graduate Council Approval _____ Date _____

CRC Approval 4-18-19 Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- X Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- X Other: Adding a laboratory fee

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date 04/16/19
Dept. Safety, Health and Industrial Hygiene
Program B.S. OSH

College School of Mines and Engineering
CRC Representative Theresa Stack

Description of Request:
Two OSH courses have embedded laboratories. Small Particles OSH 406 (3 credits) and Sampling and Evaluation of Health Hazards (3 credits) OSH 429. Both classes have multiple lab sections and are used to access student outcomes. This request is to A) separate the lecture from the lab for both courses B) change course description, title & pre-req. for the lectures and C) creating new laboratory courses.

For both courses lecture meets for 2 (two) 50 minute sessions and lab for 1 (one) 3 hour session. The lab portion meets the definition of a lab per U of MT Procedure Number 201.35 http://www.umt.edu/facultysenate/procedures/default.php#ASCRC

Separating the lab from the lectures enables accurate capturing of applied student outcomes and evaluate transfer credit requests.

- (2) abilities to design and conduct common experiments and analyze and interpret data
- (11) abilities to use techniques, skills and modern scientific and technical tools necessary for the practice of IH

Definition of Credit Hour
Credits for all coursework completed at the University of Montana shall be awarded in accordance with the Department of Education's regulations as set forth in 34 C.F.R. § 600.2.

A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than:

1. One hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester; or
2. At least an equivalent amount of work for other academic activities as established by the institution, including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

The one hour of work referred to above is approximate and may be reasonably met with a 50-60 minute time period.

Applications of the Definition
Credits awarded for short courses and workshops shall comply with ASCRC procedure 201.40 and BOR policy 309.1.

Laboratory work, practica, studio work, and similar activities may be awarded 1 credit per at least 3 hours of organized or independent academic activity per week for 15 weeks. Departments may establish a higher minimum time requirement per academic credit hour earned.

Proposed Changes in Yellow

Course # Name **Credits** **Pre-req.**

OSH 406 - Small Particle Technology Lecture

2 credits

Covers physics of air, characterization of particles, aerodynamic properties, Brownian motion and diffusion, thermodynamic properties, sources of aerosols, ~~measurement of respiratory deposition~~ aerosol deposition in the human respiratory tract and associated health outcomes, aerosol occupational and public health exposure limits, particle size selective measurement of aerosols, and control strategies. Taken with laboratory (1) credit.

ok & keep

Prerequisite(s): PHSX 121 ~~and PHSX 123~~. Course generally offered 1st semester. **Co-Requisite: ~~OSH 406 Small Particle Technology~~ laboratory (OSH 406 Sec 11 or 13).**

407

OSH 406 Small Particle Technology Laboratory
1 credit
Laboratory exercises focusing on integrated and direct reading particle size selective measurement of aerosols. Topics include size selective occupational and public health particulate matter exposure limits and sampling techniques. Field experience provided.

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

OSH 429 - Sampling & Evaluation ~~Health Hazards Lecture~~ NO

2 credits

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~~ worker exposures to common industrial ~~hygiene~~ hazards including air contaminants, noise, ~~nonionizing radiation~~ and ~~temperature extremes~~ thermal stresses. Taken with laboratory (1) credit.

Prerequisite(s): OSH 4216; PHSX 121. Course generally offered 2nd semester.
Co-Requisite: OSH 426 Sampling Laboratory Section 11 or 13

480 480

OSH 426 Sampling Laboratory
1 credit
Laboratory exercises focusing on industrial hygiene sampling techniques and procedures used for evaluating occupational health hazards. Topics includes calibration, use of personal monitoring and direct reading instrumentation for measurement of gas, vapor, particulate, fibrous contaminants, noise, and thermal stress. Field experience provided.

List of supporting documentation attached:

1. Syllabi
2.

Assessment Leading to Request
OSH courses have increased in size requiring multiple laboratory sections, increased use of GTA time and supplies. Laboratory class size (18-20) limited to fire code

Separating the lab from the lectures enables accurate capturing of applied student outcomes and evaluate transfer credit requests.

- (2) abilities to design and conduct common experiments and analyze and interpret data
- (11) abilities to use techniques, skills and modern scientific and technical tools necessary for the practice of IH

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: 2019 catalogue

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ Date 4-16-19

Dean Approval _____ Date 4-16-19

Graduate Council Approval _____ Date _____

CRC Approval _____ 4-18-19 Date _____

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) _____ Date _____

Chancellor Approval (see below) _____ Date _____

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- X Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- X Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit

Other:

MontanaTech *Curriculum Change Request Form Dated 2 Feb 2017*

Protocol: The department requesting curriculum change holds a discussion at the departmental level, and if agreed upon by the department head, discuss with the Dean for approval. Forward the completed form along with supporting information to the CRC chair after approval from the department head, dean, and graduate council if necessary. Final changes are then made by the registrar after faculty senate approval. Guidance: https://www.umt.edu/provost/faculty/curriculum/default.php.

Date 3/26/2019 **College** SME

Program : BS Petroleum Engineering

Description of Request/Summary:

1) Change pre- and co-requisites for PET 205, to add writing course requirement and change the level of math required.

Current Course Program Information:

PET 205 – Petroleum Engineering Lab #1
Prerequisites: M 171, CHMY 141, CHMY 142
Co-requisites: PET 201, M 171

Proposed Change (Attach syllabus or curriculum for new course or curriculum changes.)

Course # Name	Credits	Pre-req.
PET 205 Petroleum 205 Lab I **Change pre- and co-requisites as shown below:** ~~M 151~~, CHMY 141, CHMY 142, WRIT 121 (or 101) **Co-requisites:** M171, PET 201		

List of supporting documentation attached:

1. **Syllabus**

Assessment Leading to Request

1) In keeping with the changes by SME to the Freshmen Engineering Program from two semesters to one semester last spring, the change to the math pre-and corequisites will allow more freshmen to take this course in their first year (second semester) at Montana Tech. A number of FEP students start M 151 rather than M 171, so this would allow them to take the PET 205 without having to wait until their sophomore year.
2) The addition of the writing course prerequisite is in response to problems with students not being able to write simple sentences and articulate their ideas in a complete and coherent manner. There are a number of homework assignments, along with quiz and test questions, that require students to write in complete sentences and currently, many of the students are not up to that task.

Anticipated Impacts to "Other" Programs: None

Impact on Library: None

Date to take effect: Fall 2019

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- X Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification of 29 credits or less
- ☐ Other:

Montana Tech *Curriculum Change Request Form Dated 2 Feb 2017*

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

APPROVALS

Department Head Approval _____ Date 3/25/2019

Dean Approval _____ Date _____

VCAAR Approval (see above) _____ Date _____

Chancellor Approval (see above) _____ Date _____

Graduate Council Approval _____ Date _____

CRC Approval _____ Date _____

Faculty Senate Approval _____ Date _____

MontanaTech *Curriculum Change Request Form Dated 2 Feb 2017*

Protocol: The department requesting curriculum change holds a discussion at the departmental level, and if agreed upon by the department head, discuss with the Dean for approval. Forward the completed form along with supporting information to the CRC chair after approval from the department head, dean, and graduate council if necessary. Final changes are then made by the registrar after faculty senate approval. Guidance: https://www.umt.edu/provost/faculty/curriculum/default.php.

Date 3/26/19
Dept. Petroleum Engineering **College** SME
Program: BS Petroleum Engineering

Description of Request/Summary:
Add appropriate level STAT and CSCI courses to our list of acceptable technical electives.

Current Course Program Information:
The current curriculum plan lists the following course subject areas/levels as acceptable technical electives: 300-, 400- or 500-level Engineering, Business or Math. Students are required to complete two three-credit technical electives for their degree.

Proposed Change (Attach syllabus or curriculum for new course or curriculum changes.)

Course # Name	Credits	Pre-req.
Add Statistics (STAT) and Computer Science (CSCI) (300+ level) courses to the list of technical electives that are acceptable for the Petroleum Engineering degree.		

List of supporting documentation attached:
Copy of new curriculum worksheet with changes highlighted at bottom of page.

Assessment Leading to Request
Due to the creation of a Data Science Minor and the need for this type of knowledge in industry, it was determined that the Petroleum Department should add Computer Science (CSCI) and Statistics (STAT) upper-level courses as acceptable technical electives.

Anticipated Impacts to "Other" Programs: None.

Impact on Library: None.

Date to take effect: Fall 2019 Catalog

LEVEL of Request
Please indicate the type of request(s) by selecting *all that apply*:
Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☐ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- 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
- ☐ New degree certification of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery

- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

APPROVALS

Department Head Approval _____ Date 3/25/19

Dean Approval _____ Date _____

VCAAR Approval (see above) _____ Date _____

Chancellor Approval (see above) _____ Date _____

Graduate Council Approval _____ Date _____

CRC Approval JA 7-18-19 Date _____

Faculty Senate Approval _____ Date _____

PETROLEUM ENGINEERING CURRICULUM WORKSHEET

2019-2020 Academic Year

Revision Date: 3/26/19

Name _____

Advisor _____ Date _____

	Course Number	Course Title	Credits	SEMESTERS 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Freshman First Semester	CHMY 141	College Chemistry	3										
	CHMY 142	College Chemistry Lab I	1										
	EGEN 101	Intro. To Eng. Calcs & Prob Solv	3										
	[1]EGEN 194	Freshman Engineering Seminar	1										
	M 171	Calculus I	3										
	WRIT 121 or 101	Intro to Tech Writing (preferred) or College Writing I	3										
	[2]Hum Elec	_____	3										
Freshman Second Semester	CHMY 143	College Chemistry II	3										
	GEO 101	Intro to Physical Geology Lect/Lab	3										
	M172	Calculus II	3										
	PET 201	Elements of Petroleum Engineering	3										
	PET 205	Pet Eng Lab I Reservoir	1										
	PHSX 234	Gen Physics I	3										
	[2] Soc Elec	_____	3										
Sophomore First Semester	PET 225	Presentation and Professionalism	1										
	EGEN 201	Statics	3										
	GEO 257	Sedimentology	3										
	M 273	Multivariable Calculus	4										
	PET 304	Rock Properties	3										
	PHSX 235	Gnl Physics- Heat,Sound&Optics	3										
	PHSX 236	General Physics Lab- Heat,Sound&Optics	1										
Sophomore Second Semester	ECNS 203	Principles of Macro & Micro Econ	3										
	EGEN 335	Fluid Mechanics	3										
	M 274	Intro to Diff Equations	3										
	PET 372	Pet Fluids & Thermo	3										
	PHSX 237	General Physics- Magnetism&Wave Motion	3										
	[2]Hum Elec	_____	3										
Junior First Semester	EGEN 305	Mech of Materials	3										
	EGEN 306	Mech of Materials Lab	1										
	GEOE 357	Subsfc Meth in Pet Geol	3										
	PET 301	Well Drilling	3										
	PET 303	Drilling Fluid Lab	1										
	PET 404	Reservoir Eng	3										
	STAT 332 or M 333	Statistics for Sci & Engr OR Linear Algebra	3										
Junior Second Semester	PET 302	Pet Production Engr	3										
	PET 305	Completions	3										
	PET 307	Petroleum Production Lab I	1										
	PET 348	Well Logging	3										
	PET 410	Reservoir Simulation	3										
	WRIT 321	Advanced Tech Writing	3										
Senior First Semester	EGEN 324	Thermodynamics I	3										
	EGEN 325	Engineering Economic Analysis	3										
	PET 426	Reservoir Characterization	3										
	PET 453	Petroleum Production Lab II	1										
	[3] PET Elec	_____	3										
	[4] Tech Elec	_____	3										
Senior Second Semester	PET 446	Petroleum Project Evaluation	3										
	PET 402	Artificial Lift	3										
	PET 499W	Senior Engineering Design	3										
	[3] PET Elec	_____	3										
	[4] Tech Elec	_____	3										
			136										
Minor													
Non-Major													
		CREDITS											
		Date											
		Advisor											

[1] Transfer Students ONLY: 1-credit Engineering or Science elective (100-level or higher) or Technical Elective to replace EGEN 194. (Must submit Course Substitution form.)

[2] Humanities & Social Science acceptable electives listed in catalog

[3] Petroleum Engineering elective: 300-, 400- or 500-level

[4] Tech Elective: 300-, 400- or 500-level Engineering, Business, Math, Statistics or Computer Science

MontanaTech *Curriculum Change Request Form Dated 2 Feb 2017*

Protocol: The department requesting curriculum change holds a discussion at the departmental level, and if agreed upon by the department head, discuss with the Dean for approval. Forward the completed form along with supporting information to the CRC chair after approval from the department head, dean, and graduate council If necessary. Final changes are then made by the registrar after faculty senate approval. Guidance: https://www.umt.edu/provost/faculty/curriculum/default.php.

Date 3/26/19
Dept. Petroleum Engineering **College** SME
Program: BS Petroleum Engineering

Description of Request/Summary:
Add appropriate level STAT and CSCI courses to our list of acceptable technical electives.

Current Course Program Information:
The current curriculum plan lists the following course subject areas/levels ... al electives: 300-, 400- or 500-level Engineering, Business or Math. Students are required to compl... ectives for their degree.

Proposed Change (Attach syllabus or curriculum for
Course # Name

Add Statistics (STAT) and Computer Science (CSCI) (3 ... t are acceptable for the Petroleum Engineering degree.

#12

List of supporting documentation attached:
Copy of new curriculum worksheet with changes h

Assessment Leading to Request
Due to the creation of a Data Science Minor and the ... rmined that the Petroleum Department should add Computer Science (CSCI) a... echnical electives.

Anticipated Impacts to "Other" Programs: None.

Impact on Library: None.

Date to take effect: Fall 2019 Catalog

LEVEL of Request
Please indicate the type of request(s) by selecting *all that apply*:
Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☐ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- 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
- ☐ New degree certification of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery

- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

APPROVALS

Department Head Approval _____ **Date** _____

Dean Approval _____ **Date** _____

VCAAR Approval (see above) _____ Date _____

Chancellor Approval (see above) _____ Date _____

Graduate Council Approval _____ Date _____

CRC Approval 4-18-19 _____ Date _____

Faculty Senate Approval _____ Date _____

MontanaTech *Curriculum Change Request Form Dated 2 Feb 2017*

Protocol: The department requesting curriculum change holds a discussion at the departmental level, and if agreed upon by the department head, discuss with the Dean for approval. Forward the completed form along with supporting information to the CRC chair after approval from the department head, dean, and graduate council if necessary. Final changes are then made by the registrar after faculty senate approval. Guidance: https://www.umt.edu/provost/faculty/curriculum/default.php.

Date 01/25/2019

Dept. Professional and Technical Communications (PTC) College CLSPS

Program: B.S. Degrees: B.S. Professional and Technical Communication; B.S. Professional and Technical Communication Health and Science Communication; B.S. Professional and Technical Communication, Interactive Media; and B.S. Professional and Technical Communication, Public Relations)
M.S. Degree: Technical Communication
Graduate Certificate: Practice of Technical Communication Post-Baccalaureate Certificate

#2

Description of Request/Summary: Place in moratorium per Program Prioritization

Current Course Program Information: N/A

Proposed Change (Attach syllabus or curriculum for new course or curriculum changes.)

Course # Name	Credits	Pre-req.
XXXXXXXX		
This should include what will appear in the catalog, exactly.		

List of supporting documentation attached:

1. Example: syllabus
2. Example: Curriculum worksheet

Assessment Leading to Request
XXXXXXXX.

Anticipated Impacts to "Other" Programs
XXXXXXXX.

Impact on Library: XXXXXXXXXX has consulted with XXNameXX (XX/XX/XX) 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: XX/XX/XX

LEVEL of Request
Please indicate the type of request(s) by selecting *all that apply*:
Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)

- ☐ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- X Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☐ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

APPROVALS

Department Head Approval _____ Date 2.25.19

Dean Approval _____ Date 2/27/19

VCAAR Approval (see above) Douglas M. Abbott Date 2/07/19

Chancellor Approval (see above) _____ Date 2/27/19

Graduate Council Approval _____ Date 4/11/19

CRC Approval _____ 4-18-19 Date _____

Faculty Senate Approval _____ Date _____

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

Date 1/16/2019
Dept. Electrical Engineering College SME
Program PhD Electrical Engineering CRC Representative John Morrison

Need access to all lib.

Description of Request:
Start a new PhD Electrical Engineering program. The program shall consist of a minimum of 60 post-baccalaureate credits, including a minimum of 18 credits of dissertation. The student must pass the following exams:

- A departmental qualifying exam administered in their first or second year.
- A comprehensive exam to be passed within two years of the qualifying exam.
- A final exam and defense of a dissertation based on the student's research.

The minimum of 60 credits consists of:

- At least 33 credits of course work consisting of
  - 1 credit of PhD seminar (ENGR 694). Taken as part of the comprehensive exam with the goal of presenting a research proposal.
  - T.C. 5150, one credit, Graduate Writing Seminar.
  - ENGR 5940, one credit, Graduate Seminar.
  - 6 credits selected from math, statistics, computer science, software engineering, and/or data science (at the 400 level or higher) approved by the advising committee.
  - A minimum of 15 credits of graduate-level Electrical Engineering courses approved by the advising committee.
  - The remaining courses must be at the 400-level or higher as approved by the advising committee.
  - At least 15 credits or course work, including the three credits of seminar, must be completed at Montana Tech. The remaining can be from any institution approved by the department.
- At least 18 credits of Doctoral Thesis (EELE 6990). All Thesis credits must be completed at Montana Tech.

Applicable course work completed under a master's degree may count towards the required course work as approved by the advising committee.

As typical for engineering PHD degrees, the curriculum for each student will be tailored to support the research. Unique traits of the program will include:

- A world-class curriculum delivered by experts across the US enabled by key collaborations and distance delivery. This model enables a dynamic and high-quality curriculum without the cost of hiring world experts at Montana Tech for all areas. In addition to Tech graduate Electrical Engineering courses, approved courses may be selected from a list of on-line courses offered by many outstanding institutions (e.g., Purdue University and Idaho State University). The list of outside courses must be approved by the Tech EE faculty.
- MSU-Bozeman has EE faculty expertise very complimentary to Montana Tech. We will openly invite and seek appropriate MSU-Bozeman EE faculty to be Tech affiliate faculty and participate in Tech graduate committees. The EE departments at the two institutions have an excellent working relationship.
- The primary focus for this program will initially be in electric power and energy. The University of Idaho, Washington State University and Arizona State University are the three nearest universities that have a focus on power and energy.
- Significant industrial financial support to seed key infrastructure and personnel requirements. This includes development and construction of a new electric energy and power lab. This lab will enable novel research and instructional excellence.

Current Course or Program Information:
Currently, the department offers several graduate-level Electrical Engineering courses. In addition, ENGR 694 (Doctoral Seminar) will be added.

60 Credits

Proposed Change

Course # Name	Credits	Pre-req.
ENGR 694. Doctoral Seminar, 1 Credit, Prerequisite: Doctoral standing or consent of instructor. Taken as part of the comprehensive exam. Student presents their research proposal and completes the comprehensive exam as directed by the department. Pass/Fail.		

Q. on lib access.

credits

30 (½) 500 level
credits-18 600 doctoral dissertation

MontanaTech *Curriculum Change Request Form Dated 6 September 2018*

APPROVALS

Department Head Approval _____ Date 1/16/2019

Dean Approval _____ Date 1-24-19

Graduate Council Approval _____ Date 4-11-19

CRC Approval _____ Date 4-18-19

Faculty Senate Approval _____ Date _____

VCAA Approval (see below) Douglas M. Habratt Date 2/5/19

Chancellor Approval (see below) _____ Date 2/5/19

LEVEL of Request

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

Faculty Approvals (directly to CRC, then Faculty Senate):

- ☐ Establish a new course for the catalog (please contact the Registrar of MUS CCN information)
- ☐ Changed course: addition, deletion or change of title, credit, course number, pre-req, description, or cross listing.
- ☐ 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
- ☐ New degree certification program of 29 credits or less
- ☐ Other:

Campus Approvals (must be approved by the VCAA prior to CRC submission):

- ☐ Placing a postsecondary educational program into moratorium
- ☐ Withdrawing a postsecondary educational program from moratorium
- ☐ Establishing, re-titling, terminating or revising a campus certificate of 29 credits or more
- ☐ Establishing a B.A.S./A.A./A.S. area of study
- ☐ Offering an existing postsecondary educational program via distance or online delivery
- ☐ Other:

OCHE Approvals *(must be approved by the VCAA and Chancellor prior to CRC submission)*:

- ☐ Re-titling an existing postsecondary educational program
- ☐ Terminating an existing postsecondary educational program
- ☐ Consolidating existing postsecondary educational programs
- ☐ Establishing a new minor where there is a major or an option in a major
- ☐ Revising a postsecondary educational program
- ☐ Establishing a temporary C.A.S. or A.A.S. degree program Approval limited to 2 years
- ☐ Other:

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

- ☒ Establishing a new postsecondary educational program
- ☐ Exceeding the 120 credit maximum for baccalaureate degrees Exception to policy 301.11
- ☐ Forming, eliminating or consolidating an academic, administrative, or research unit
- ☐ Re-titling an academic, administrative, or research unit
- ☐ Other:

Montana Board of Regents

CURRICULUM PROPOSAL FORM

1. **Overview of the request and resulting changes.** Provide a one-paragraph description of the proposed program. Will this program be related or tied to other programs on campus? Describe any changes to existing program(s) that this program will replace or modify. *[100 words]*

Montana Technological University (Montana Tech) seeks authorization to offer a Doctor of Philosophy in Electrical Engineering (PhD EE).

2. **Relation to institutional strategic goals.** Describe the nature and purpose of the new program in the context of the institution's mission and core themes. *[200 words]*

Montana Tech is designated as a special focus Science & Engineering institution with the mission of

"Montana Tech, through exemplary undergraduate and graduate education, workforce development, research, and service, builds on a strong heritage in engineering, science, and technology that blends theory with practice in meeting the changing needs of society and the responsible development and use of natural resources."

The PhD EE program directly supports Montana Tech's mission related to graduate education and research in engineering. Montana Tech's EE program will primarily focus on energy development and delivery which directly relates to the responsible use of natural resources.

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

This proposal began over a decade ago when Montana Tech initiated the development of a research program in electric energy and power systems. This research program is now one of the most successful at Montana Tech. Lack of a PhD program has now limited the potential of this program. In 2017, the faculty began developing a pedagogical plan to deliver a quality and efficient PhD program to support the research.

Montana Board of Regents

CURRICULUM PROPOSAL FORM

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

   a. List the program requirements using the following table.

	Credits
Credits in required courses offered by the department offering the program	42 or less
Credits in required courses offered by other departments	42 or less
Credits in institutional general education curriculum	0
Credits of free electives	0
Total credits required to complete the program (a student entering with a Master's could transfer up to 24 applicable course credits to apply to the 60 credit total). At least 18 credits of dissertation research. At least 32 credits of course work at the 400 level or higher. At least 50% of all course work must be at the 500 level. Curriculum is tailored to meet research goals.	60

   b. List the program learning outcomes for the proposed program. Use learner-centered statements that indicate what students will know, be able to do, and/or value or appreciate as a result of completing the program.

Students completing the program will:

1. Acquire advanced knowledge, research skills, and understanding in electrical engineering;
2. Blend the theory with practice of science and engineering to research and solve advanced electrical engineering problems;
3. Be able to communicate technical and scientifically complex material orally, in writing, and using various media for a broad range of audiences;
4. Make a significant and original contribution to the advancement of research and knowledge in electrical engineering.

5. **Need for the program.** To what specific student, regional, and statewide needs is the institution responding to with the proposed program? How will the proposed program meet those needs? Consider workforce, student, economic, societal, and transfer needs in your response as appropriate. *[250 words]*

PhD engineering education generates new knowledge by conducting research supported by an in-depth curriculum. It is the foundation of innovation that solves society's most pressing problems and fuels a competitive economy. In the US, these issues are especially acute in the production, storage, and delivery of electric energy. The number of US PhDs awarded in engineering per year has increased by nearly 1/3 over the past 10 years [1], many of these related to energy. The demand for PhDs focused in electrical energy is significant. An aging US electric infrastructure combined with substantial demand for renewable energy sources and energy storage has created a significant demand for new technology solutions.

Montana has substantially low PhD production in engineering. For example, of the 11,702 PHDs in engineering awarded in the US in 2014/15, only 0.09% came from Montana (MSU) – see "Numbers" below. EE/related represent the largest engineering PhD award discipline in the US. Of the 2,525 PhDs

awarded in the US in EE/related areas, 3 were awarded in Montana (at MSU), this represents 0.12% of the total. If one considers a three-year average, Montana's performance is even lower. Montana significantly lags in innovation.

Numbers (as a reference, Montana has 0.32% of the total US population):

PhDs awarded in the US in 2014/15 [1]:

- 11,702 in engineering
  - 2,525 PhDs in EE or related
- PhDs awarded in Montana in 2014/15 [2]:
  - 10 in engineering (0.09% of the US total). The 3-year average for 2013/14 thru 2015/16 is 9.33 graduates (0.08% of the US 2014/15 total)
  - 3 PhDs in EE or related (0.12% of the US total). The 3-year average for 2013/14 thru 2015/16 is 2.0 graduates (0.08% of the US 2014/15 total).

Change in PhD EE awarded [3]:

- Nationally, the number of PHD EEs awarded from 2005 to 2015 has increased by 49%.
- In Montana, the number has remained flat at 3 or less degrees awarded for the same time period.

[1] B. L. Yoder, "Engineering by the Numbers," American Society of Engineering Education 2015 survey, https://www.asee.org/papers-and-publications/publications/college-profiles/15EngineeringbytheNumbersPart1.pdf.
[2] http://www.montana.edu/opa/kpi/pdfs/FY16KPIEngr.pdf.
[3] https://www.nsf.gov/statistics/2018/nsb20181/report.

6. **Similar programs.** Use the table below to identify and describe the relationship between any similar programs within the Montana University System.

Institution Name	Degree	Program Title
MSU	PhD	Electrical Engineering

a. If the proposed program substantially duplicates another program offered in the Montana University System, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. *[200 words]*

The goal of the PhD EE program is to support research at Tech.

For more than a decade, Tech's EE department has had a robust externally-funded research portfolio. While the research has supported many Tech MS students, much of the research has

required PhD-level comprehension. The research has been executed via a combination of Tech faculty, hiring research faculty, and collaborations with other universities. One of these collaborations has been MSU. This has included Tech faculty serving on MSU PhD student committees, and having Tech faculty advise PhD students who work on Tech funded projects.

Tech's plan is to build a world-class curriculum delivered by experts across the US enabled by key collaborations and distance delivery. This model enables a dynamic and high-quality curriculum without the cost of hiring the world experts at Montana Tech. A survey of available grad-level distance-delivery courses in engineering is truly extensive. This includes some of the largest research universities in the nation (Purdue, Arizona State University, etc.). Within the northwest U.S., the University of Idaho has an extensive and mature on-line offering. Grad courses being on-line is the new norm. Tech will offer our graduate courses via distance delivery to any appropriate partner including MSU. Tech will include all appropriate and available courses from other institutions in our curriculum. This certainly includes MSU graduate engineering courses.

MSU has EE faculty expertise very complimentary to Tech. We openly invite and seek appropriate MSU EE faculty to be Tech affiliate faculty and participate in Tech graduate committees. The EE departments at the two institutions have an excellent working relationship.

b. Describe any efforts that were made to collaborate with similar programs at other institutions. If no efforts were made, please explain why. *[200 words]*

In 2017, MSU proposed and was granted approval to re-establish a PhD EE program at MSU. Montana Tech openly supported this proposal including writing a letter of support dated June 2017 authored by the then head of Tech EE department. In this letter, Tech stated

"As you know, Tech's eventual goal is to have a collaborative PhD EE within the MUS. It is our hope that when the time comes for Montana Tech to submit our PhD EE proposal, MSU-Bozeman will in turn support our request."

MSU's 2017 level II proposal states:

"The MSU Electrical & Computer Engineering (ECE) faculty and the Montana Tech Electrical Engineering (EE) faculty have agreed to continue coordinating faculty research and graduate cooperation, as well as encourage qualified Montana Tech faculty to participate in the re-established EE doctoral program administered by the MSU ECE Department. An agreement between the MSU ECE faculty and the Montana Tech EE faculty has been in place since 2008 that allows qualified electrical engineering professors from Montana Tech to recruit, mentor, and supervise graduate students."

The said agreement has never been formalized. While MSU and Tech faculty have a strong collaboration, policies and procedures outside the departments have caused significant frustration for Tech faculty. Efforts to address these frustrations and to build a truly collaborative program have failed.

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CURRICULUM PROPOSAL FORM

MSU's administration has expressed non-support for Tech's PhD EE proposal.

7. **Implementation of the program.** When will the program be first offered? If implementation will occur in phases, please describe the phased implementation plans. *[100 words]*

The program will be first offered in Fall 2019. No new courses are needed, as the curriculum uses existing courses and on-line courses offered from many universities across the country.

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

Fall Headcount Enrollment					Graduates				
AY_19_20	AY_20_21	AY_21_22	AY_22_23	AY_23_24	AY_22_23	AY_23_24	AY_24_25	AY_25_26	AY_26_27
1	3	5	6	6	0	1	2	2	2

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

The Fall headcount enrollment is based on admitting one to two students per year, with students graduating after two to five years. It is expected that approximately half of the incoming students will already have an MS degree while the other half will enter with a BS. This conservative projection is based on Tech's decade-long experience with its MS EE program, PhD students Tech has been advising via collaborations with the University of Wyoming and MSU, and the use of visiting research faculty.

The expectation is that all PhD EE students will be fully funded via external research grants. Tech's EE department has maintained a large and robust externally-funded research program for more than a decade. The PhD EE program will be supported by this research.

c. What is the initial capacity for the program?

The initial capacity for the program is two new students in Fall 2019.

8. **Program assessment.** How will success of the program be determined? What action would result if this definition of success is not met? *[150 words]*

The program will be assessed per Montana Tech's Graduate School Assessment Plan. Key metrics include applications, enrollment, graduates, placements, and impact. Impact includes grant revenues, peer-reviewed publications, student and faculty awards, and fiscal soundness. The Graduate School follows a 2-year assessment cycle. In year 1 of the cycle, the Graduate School and the program will consider the assessment metrics and use them to guide actions and decisions. In year 2, a formal program review document will be prepared by the EE department head and reviewed by faculty and administration. When performance falls short, action plans will be developed and implemented. A major assessment of the program will be conducted at the end of the third 2-year cycle to determine whether enrollment, completions, and impact are on track.

Montana Board of Regents

CURRICULUM PROPOSAL FORM

a. Describe the assessment process that will be used to evaluate how well students are achieving the intended learning outcomes of the program. When will assessment activities occur and at what frequency? *[150 words]*

The assessment data will be collected annually by the EE department in late spring and reviewed by the faculty, who will determine any modifications or corrective actions needed to enable students to achieve the learning outcomes, if they are falling short. The assessment will be shared with the deans. Every two years a formal assessment report will be prepared, that also summarizes impacts of changes. This report will be reviewed by faculty, deans, and provost. The overall goal is to ensure that the program (a) is meeting learning outcomes, (b) is on a sustainable enrollment trajectory, and (c) is attracting high-quality students and producing high quality graduates to meet the workforce demand.

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

Direct measures of student learning include performance on the program's exams, the dissertation and its defense, peer-reviewed publications, placement rates, and conference presentations. Indirect measures include the judgment of graduate committees and participation in special experiences (such as software training, professional development sessions, professional society membership, field experiences, and conference attendance). Programmatic goals will be assessed directly via enrollment, completions, time-to-degree, placement rates, and research funding.

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

The assessment findings will be reviewed by the faculty, EE department head, deans and provost on a semi-annual schedule. The deans will hold faculty and the EE department head accountable for using the findings to ensure the quality of the program. A formal written report will be produced every two years, as part of Montana Tech's program review process. This report will be reviewed and evaluated by Montana Tech's Assessment Committee, which will determine whether it and actions taken or proposed are acceptably ensuring the quality of the program.

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

Specialized accreditation is not applicable to PhD programs in this field.

9. Physical resources.

a. Describe the existing facilities, equipment, space, laboratory instruments, computer(s), or other physical equipment available to support the successful implementation of the program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated? *[200 words]*

Montana Tech's EE department has several teaching and research labs that will be utilized by the PhD EE students. The impact on the usage of these labs will be minimal because the PhD EE program is not a high-enrollment program. It is expected that research volume will increase under this new program, but not to the level that negatively impacts usage of existing labs.

Montana Board of Regents
CURRICULUM PROPOSAL FORM

b. List needed facilities, equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. (Enter the costs of those physical resources into the budget sheet.) How will the need for these additional resources be met? *[150 words]*

For the program to be fully successful, Montana Tech needs a new state-of-the-art electrical energy and power lab. Montana Tech has recently received a large donation from an industrial partner (Schweitzer Engineering Laboratories - SEL) to fund 100% of the construction and furnishing of this lab (estimated at $1.5 million). The lab will be located on the 3rd floor of the new Natural Resources Research Building.

10. Personnel resources.

a. Describe the existing instructional, support, and administrative resources available to support the successful implementation of the program. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained? *[200 words]*

Instructional, support, and administrative resources are currently adequate. Montana Tech maintains 5 tenured/tenure-track faculty lines within the EE department. The dean of the School of Mines and Engineering is also tenured within the EE department and is active in research. All have terminal degrees. In addition, the department often has visiting faculty funded via research grants. Also, Tech offers a wide variety of math, science, and engineering courses outside of EE that will be utilized by PhD EE students.

A world-class curriculum to support the PhD EE program will be delivered by experts across the US enabled by distance delivery. This model enables a dynamic and high-quality curriculum without the cost of hiring world experts at Montana Tech for all areas. In addition to Tech graduate and upper-division courses, approved courses may be selected from a list of on-line courses offered by many outstanding institutions. A survey of available grad-level distance-delivery courses in EE is truly extensive. This includes some of the largest research universities in the nation (Purdue, Arizona State University, etc.). Within the northwest U.S., the University of Idaho has an extensive and mature on-line offering. Grad courses being on-line is the new norm. Tech will offer our EE graduate courses via distance delivery.

The program will require the funding of a full GRA and waiver co-funded from the graduate school and the department. The estimated cost of this is $30,000 per year. The GRA will assist in recruiting new applicants.

b. Identify new personnel that must be hired to support the proposed program. (Enter the costs of those personnel resources into the budget sheet.) What are the anticipated sources or plans to secure the needed qualified faculty and staff? *[150 words]*

No new personnel are required to support this program.

11. Other resources.

a. Are the available library and information resources adequate for the proposed program? If not, how will adequate resources be obtained? *[100 words]*

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The available library and information resources are adequate. These resources already support the BS and MS EE programs.

b. Do existing student services have the capacity to accommodate the proposed program? What are the implications of the new program on services for the rest of the student body? *[150 words]*

The existing student services have the capacity to accommodate the proposed program.

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

a. Please complete the following table of budget projections using the corresponding information from the budget template for the first three years of operation of the new program.

	Year 1	Year 2	Year 3
Revenues			
Expenditures			
Net Revenue (revenues-expenditures)			

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

New expenses are anticipated to be relatively small as no new courses are required because the PhD students will be taking the same low-enrollment advanced graduate-level courses as are currently serving the MS EE program. The program will require converting some key EE graduate courses to an online format. This will require training for some EE faculty, but the associated costs are within the university's existing budget. Also, the program will require a GRA and waiver co-funded by the graduate school and the department. The estimated cost of this is $30,000 per year.

i. If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs? *[150 words]*

No reallocation of state funds is planned.

ii. If an increase in base funding is required to fund the program, indicate the amount of additional base funding and the fiscal year when the institution plans to include the base funding in the department's budget.

No increase in base funding is required.

iii. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? *[150 words]*

See item 9b above. The new lab is a one-time cost from an industrial donation.

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iv. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? *[150 words]*

There are no current federal grants, other grants, special fee arrangements or contracts that are valid to fund the program.

13. **Student fees.** If the proposed program intends to impose new course, class, lab, or program fees, please list the type and amount of the fee.

No new fees are proposed.

14. Complete the budget template below with the following information:
    - Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program.
    - Include reallocation of existing personnel and resources and anticipated or requested new resources.
    - Amounts should reconcile subsequent pages where budget explanations are provided.

Signature/Date
College or School Dean:

Chief Academic Officer:

Chief Executive Officer:

Flagship Provost*:

Flagship President*:
*Not applicable to the Community Colleges.

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BUDGET IN PRORESS WITH CARLEEN CASSIDY

I. PROJECTED STUDENT ENROLLMENT

	FY 2020		FY 2021		FY 2022	
	FTE	Headcount	FTE	Headcount	FTE	Headcount
Projected enrollments	**3**	**3**	**6**	**6**	**9**	**9**

II. REVENUE

	FY 2020		FY 2021		FY 2022	
	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request						
2. Institution Funds						
3. Federal						
4. New Tuition Revenues from Increased Enrollments						
5. Student Fees						
6. Other (i.e., Gifts)						
Total Revenue		**$0**		**$0**		**$0**

Ongoing is defined as ongoing operating budget for the program which will become part of the base.

One-time is defined as one-time funding in a fiscal year and not part of the base.

III. EXPENDITURES

	FY 2020		FY 2021		FY 2022	
	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs						
1. FTE						
2. Faculty						
3. Adjunct Faculty						
4. Graduate/Undergrad Assistants						
5. Research Personnel						

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6. Directors/Administrators						
7. Administrative Support Personnel						
8. Fringe Benefits						
9. Other:						
Total Personnel and Costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

	FY 2020		**FY 2021**		**FY 2022**	
	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures						
1. Travel						
2. Professional Services						
3. Other Services						
4. Communications						
5. Materials and Supplies						
6. Rentals						
7. Materials & Goods for Manufacture & Resale						
8. Other:						
Total Operating Expenditures		**$0**		**$0**		**$0**

	FY 2020		**FY 2021**		**FY 2022**	
	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay						
1. Library Resources						
2. Equipment						
Total Capital Outlay	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

	FY 2020	**FY 2021**	**FY 2022**

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	On-going	One-time	On-going	One-time	On-going	One-time
D. Capital Facilities Construction or Major Renovation						

	FY 2020		FY 2021		FY 2022	
	On-going	One-time	On-going	One-time	On-going	One-time
E. Other Costs						
1. Utilites						
2. Maintenance & Repairs						
3. Other:						
Total Other Costs	$0	$0	$0	$0	$0	$0
TOTAL EXPENDITURES:		$0		$0		$0
Net Income (Deficit)		$0		$0		$0

Budget Explanations:
I. Student Enrollment

II. Revenues

III. Expenditures
A. Personnel

B. Operating Expenditures

C. Capital Outlay

D. Capital Facilities Construction or Major Renovation

E. Other costs

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.

_____

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Campus Chief Financial Officer Signature

Chief Financial Officer comments:

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Appendix A – Proposed New Curriculum

The PhD EE program shall consist of 60 post-baccalaureate credits, including a minimum of 18 credits of dissertation and at least 32 credits of courses. Course work shall include the following:

- All course work must be approved by the advising committee and the EE department head.
- All course work must be at the 400 level or higher (or the equivalent).
- 50% or more of all course work must be at the 500 level or higher (or the equivalent).
- At least 12 credits of course work must be from Montana Tech.
- Tech's EE department shall maintain an approved list of online courses available from other universities.

In the process of the degree, the student must pass the following exams:

- A qualifying exam administered in their first or second year.
- A comprehensive exam to be passed within two years of the qualifying exam.
- A final exam and defense of a dissertation based on the student's research.

Course work must be at the 400 level or higher as approved by the advising committee and EE department head. Applicable course work completed under a master's degree may count towards the required course work as approved by the advising committee and EE department head.

All Montana Tech graduate-school entrance requirements apply. Entrance into the PhD EE program also requires a bachelors in EE from an ABET accredited program, or a masters in EE from an institution that has an appropriate ABET accredited program. Applicants with a bachelors or masters degree in a related field (engineering, science, or mathematics) will be considered but may be required to complete deficiency courses. Applicants will be reviewed and considered on an individual basis.

Preamble—The Nature of Academic Freedom

A university fuses and integrates teaching, learning, civic engagement and research. A university is a community of scholars characterized by free expression, free inquiry, intellectual honesty, respect for the dignity of others, and openness to constructive criticism and change. Students and faculty at a university must be afforded rights that are congruent with these academic duties, qualities and values. These rights of producing, consuming and disseminating knowledge without restraint or interference are embodied in academic freedom. "Our Nation is deeply committed to safeguarding academic freedom, which is of transcendent value to all of us, and not merely to the teachers concerned. That freedom is therefore a special concern of the First Amendment." (*Keyishian vs. Board of Regents*—U.S. Supreme Court)

The academic freedom rights of members of the university are essentially those citizens possess as members of a democratic nation. Freedom of thought and expression are basic human rights. "Academic freedom is a special concern of the First Amendment." (*Regents of California vs. Bakke*, U.S. Supreme Court)*The university, however, has a special autonomy and reasoned dissent plays a particularly vital part in its existence. All members of the University have the right to press for action on matters of concern by any appropriate means. The University must affirm, assure and protect the rights of its members to organize and join political associations, convene and conduct public meetings, publicly demonstrate and picket in orderly fashion, advocate and publicize opinion by print, sign, and voice.* (Harvard University)

Certain values are essential to the university's nature and essence as an academic community and must be nurtured, defended and preserved. Among these are freedom of speech and academic freedom, freedom from personal force and violence, freedom to criticize and seek change, freedom to study, teach, pursue knowledge and research and freedom from coercion. Interference with any of these freedoms must be regarded as a serious violation of the personal rights upon which an academic community is based and as serious violations of academic freedom. Albert Einstein accurately explains this central aspect of academia even further when he states: "By academic freedom I understand the right to search for truth and to publish and teach what one holds to be true. This right implies also a duty: one must not conceal any part of what one has recognized to be true."

All members of the university have the duty to protect and uphold the rights and responsibility encompassed under Academic Freedom. "Scholarship cannot flourish in an atmosphere of suspicion and distrust. Teachers and students must always remain free to inquire, to study and to evaluate. . ." *(Sweezy v. New Hampshire,* U.S. Supreme Court)

Statement on Academic Freedom

Teachers are entitled to freedom in the classroom**,** on campus, and off campus while in the course of fulfilling their obligations as faculty members, in discussing their subject, but they should be careful not to introduce into their teaching controversial matter which has no relation to their subject. The intent of this statement is not to discourage what is “controversial.” Controversy is at the heart of the free academic inquiry which the entire statement is designed to foster. This passage serves to underscore the need for teachers to avoid persistently intruding material which has no relation to their subject. In considering the appropriateness of an utterance in question, the Administration is encouraged to consider relevant associational norms, including but not limited to the norms of the disciplines to which faculty members belong and the norms of other appropriate college and university association.

College and university teachers are citizens, members of a learned profession, and officers of an educational institution. College and university teachers should be accorded full academic freedom as defined in the preamble of this document. The university administration has a duty and responsibility to protect and nurture academic freedom as defined in the preamble of this document. Appropriate policies must in place at a university that ensure that academic freedom will be nurtured and protected as defined in the preamble to this document. These policies must be approved by the faculty.

When they speak or write as citizens, teachers should be free from institutional censorship or discipline, but their special position in the community imposes special obligations. As scholars and educational officers, they should remember that the public may judge their profession and their institution by their utterances. Hence they should at all times be accurate, should exercise appropriate restraint, should show respect for the opinions of others, and should make every effort to indicate that they are not speaking for the institution. None of the forgoing caveats shall be construed as restricting the academic freedom of university teachers.

If the administration of a college or university feels that a teacher has not observed the admonitions in this statement and believes that the extramural utterances of the teacher have been such as to raise grave doubts concerning the teacher's fitness for his or her position, it may proceed to pursue termination for cause. In pressing such charges, the administration should remember that teachers are citizens and should be accorded the freedom of citizens. In such case the administration must assume full responsibility. The burden of proof rests with the administration of a college.

The controlling principle is that a faculty member's expression of opinion as a citizen cannot constitute grounds for dismissal unless it clearly demonstrates the faculty member's unfitness for his or her position**,** nor can it constitute grounds for disciplinary/corrective action short of dismissal without just cause. Extramural utterances rarely bear upon the faculty member's fitness for position. Moreover, a final decision should take into account the faculty member's entire record as a teacher and scholar.

Academic freedom applies to both the individual faculty member and the institution.