Faculty Senate

1/14/2026
9:00 a.m.
Mill 201

I. Welcome and Minutes: https://www.mtech.edu/facultystaff/facultysenate/minutes/docs/2025/minutes-11-12-25.pdf

Action Items

II. CRC
   a. LCME (Mechanical Engineering) – Prerequisite Changes
   b. LCME (Mechanical Engineering) – Mechatronics Minor with Related New Courses
   c. LCME (Mechanical Engineering) – Prerequisite Changes
   d. LCME (Mechanical Engineering) – Welding Engineering Minor
   e. CLSPS (Mathematics) – New Course with Lab

III. Chancellor's Cabinet – Revised Naming of Buildings

Information Items

IV. 1st Read – Buyout Policy

V. NWCCU Accreditation Update and Program Review Draft
   a. Request to Plan
   b. Curriculum

Discussion Items

VI. Request for campus-level organizational and responsibilities chart with related contact information

VII. Energy Engineering and Science PhD

VIII. Proposed Spring meeting dates:
- Friday 1/30 – 1 p.m.
- Wednesday 2/11 - 9 a.m.
- Friday 2/27 – 1 p.m.
- Wednesday 3/11 - 9 a.m.
- Friday 3/27 – 1 p.m.
- Wednesday 4/8 - 9 a.m.
- Friday 4/24 – 1 p.m.

IX. For the good of the order

MONTANA TECH

Type of Request

- Propose a new course
  - Complete all sections in the Course Description. Ensure that everything appears exactly as you want it to appear in the catalog
  - Complete Appendix A: CCN Review (Consult with the registrar if you have questions)
- Revise an existing course
  - Complete all sections in the Course Description. Ensure that everything appears exactly as you want it to appear in the catalog

Timeline

- Propose a new course
  - One week before CRC meeting – Submit proposal to CRC chair
- Revise an existing course
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MONTANA TECH

Curriculum Change Form AY 25-26
Course Level Change Request

Course Information

Department Mechanical Engineering College Lance College of Mines and Engineering

Effective Term: AY 26/27 Course Title: Intro to Modeling for Mechanical Engineers

Does this proposal affect other departments?
☐Yes, Provide a list of affected departments Click or tap here to enter text.
☒No

Proposal type: Revise an existing course

Assessment Leading to Request
With the way the course is currently taught, the current prerequisite (M172) is not appropriate and presents an unnecessary barrier to students registering for the course. Also, The ME department discussed and agreed no prerequisites are required. The department also believes that EMEC 215 could be offered as a dual-credit course and eliminating prerequisites would allow more high school students to take the course.

Course Description

Course Prefix: EMEC Course Number: 215

Credits 1
Hours: Lecture 0 Lab 1

Repeatable
☒ Yes ☐ No

Prerequisites
None

Corequisites (include course codes and titles)
None

Semesters Offered (select all that apply)
☒Fall ☒Spring ☐Summer ☐Intermittent

Course Description
Concepts of concurrent engineering and computer aided design are introduced. The use of computer aided design (CAD) software and engineering computer graphics will enable the student to create three-dimensional computer models and engineering drawings of typical mechanical component.

Course Learning Outcomes
This course provides the students the tools to:

1. Understand and apply basic concepts of computer aided design (CAD).
2. Create basic 2D and 3D computer models, 3D assemblies, and engineering drawings.
3. Solve engineering problems using basic calculations, simple programing, graphing, and CAD software.

MONTANA TECH

Appendix A: CCN Review

Does an equivalent course exist elsewhere in the MUS CCN Course Guide? https://ccn.mus.edu/search/

☐ Yes ☐ No

MONTANA TECH

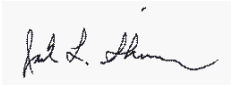
Required approvals for all courses

11/17/2025

X 

Department Head
Signed by: 87af6ad9-1a3c-4ed0-a298-cad35532c3eb

11/18/2025

X 

College Dean
Signed by: a2898a84-a2bb-4cc8-b156-0bdabf5adf7a

X

CRC Chair

Approved at CRC meeting on Click or tap to enter a date.

X

Faculty Senate Chair

Approved at Senate meeting on Click or tap to enter a date.

MONTANA TECH

Type of Request

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MONTANA TECH

Curriculum Change Form AY 25-26
Course Level Change Request

Course Information

Department Mechanical Engineering College Lance College of Mines and Engineering

Effective Term: AY 26/27 Course Title: Mechanical Engineering Lab

Does this proposal affect other departments?

☐Yes, Provide a list of affected departments Click or tap here to enter text.

☒No

Proposal type: Revise an existing course

Assessment Leading to Request

With the way the lab and other ME courses are currently taught, the current prerequisites (EGEN 434, EMEC 326, EMEC 455) are not appropriate and present an unnecessary barrier to students registering for the course. The ME department discussed and agreed that the prerequisites listed below are more appropriate.

Course Description

Course Prefix: EMEC Course Number: 402

Credits 1

Hours: Lecture 0 Lab 1

Repeatable

☒ Yes ☐ No

Prerequisites

EMEC 341

Corequisites (include course codes and titles)

Click or tap here to enter text.

Semesters Offered (select all that apply)

☒Fall ☒Spring ☐Summer ☐Intermittent

Course Description

Covers practical application and experimentation in the areas of energy conversion, heat transfer, power cycles, HVAC, dynamics, kinematics, vibration analysis and balancing.

Course Learning Outcomes

This course provides the students the tools to:

1. Perform experimentations of practical applications in the areas of energy conversion, heat transfer, power cycles, HVAC, dynamics, kinematics, vibration analysis, and balancing.
2. Understand real world applications of the fluid dynamic fundamental principles.
3. Write and review technical reports and work in a group environment.

Appendix A: CCN Review

Does an equivalent course exist elsewhere in the MUS CCN Course Guide? https://ccn.mus.edu/search/

☐ Yes ☐ No

MONTANA TECH

Required approvals for all courses

11/17/2025

X 

Department Head
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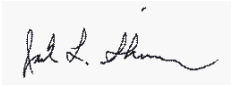
11/18/2025

X 

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Type of Request

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MONTANA TECH

Curriculum Change Form AY 25-26
Course Level Change Request

Course Information

Department Mechanical and Electrical Engineering College Lance College of Mines and Engineering

Effective Term: AY 26/27 Course Title: Dynamic System Modeling

Does this proposal affect other departments?

☐Yes, Provide a list of affected departments Click or tap here to enter text.

☒No

Proposal type: Propose a new course

Assessment Leading to Request

This course is being proposed to support the proposed minor in mechatronics.

Course Description

Course Prefix: EGEN Course Number: 304

Credits 3

Hours: Lecture 3 Lab 0

Repeatable

☒ Yes ☐ No

Prerequisites

M 274 and PHSX 234

Corequisites (include course codes and titles)

PHSX 235 or EGEN 324 or EMEC 320; and PHSX 237 or EELE 201.

Semesters Offered (select all that apply)

☒Fall ☒Spring ☐Summer ☐Intermittent

Course Description

Modeling and simulation of dynamic systems. This includes basic electrical, mechanics, and thermal systems. Model forms include Laplace transfer functions and state-space models. Response of linear 1st and 2nd order linear systems to impulse, step, and sinusoid inputs – including frequency response plots. The concepts of stability and feedback are introduced.

Course Learning Outcomes

At the completion of the course, students will be able to:

1. Understand the transfer function form for dynamic modelling.
2. Understand the state-space form for dynamic modelling.
3. Understand how to model basic linear electric circuits.
4. Understand how to model basic mechanical and electro-mechanical systems.
5. Understand how to model basic thermal systems.
6. Understand the concepts of stability and feedback.
7. Simulate dynamic systems.
8. Calculate 1st and 2nd order system responses to an impulse, step, and sinusoid input.
9. Calculate the frequency response of a system.

MONTANA TECH

Appendix A: CCN Review

Does an equivalent course exist elsewhere in the MUS CCN Course Guide? https://ccn.mus.edu/search/

☐ Yes ☒ No

MONTANA TECH

Required approvals for all courses

11/17/2025

X 

Department Head
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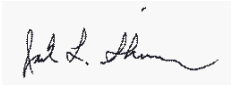
11/18/2025

X 

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X

Faculty Senate Chair

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MONTANA TECH

Type of Request

- Propose a new course
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- Revise an existing course
  - Complete all sections in the Course Description. Ensure that everything appears exactly as you want it to appear in the catalog

Timeline

- Propose a new course
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- Revise an existing course
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MONTANA TECH

Curriculum Change Form AY 25-26
Course Level Change Request

Course Information

Department Mechanical and Electrical Engineering College Lance College of Mines and Engineering

Effective Term: AY 26/27 Course Title: Mechatronic Design

Does this proposal affect other departments?
☐Yes, Provide a list of affected departments Click or tap here to enter text.
☒No

Proposal type: Propose a new course

Assessment Leading to Request
This course is being proposed to support the proposed minor in mechatronics.

Course Description

Course Prefix: EGEN Course Number: 465

Credits 3
Hours: Lecture 3 Lab 0

Repeatable
☒ Yes ☐ No

Prerequisites
EGEN 304

Corequisites (include course codes and titles)
None.

Semesters Offered (select all that apply)
☒Fall ☒Spring ☐Summer ☐Intermittent

Course Description
The design of Mechatronic systems which requires the integration of mechanical and electrical engineering through a unified framework. This will include low-level interfacing of software with hardware, use of high-level graphical programming tools to implement real-time computation tasks, digital logic, analog interfacing and power amplifiers, measurement and sensing, electromagnetic and optical transducers, and control of mechatronic systems. Students will be able to perform the necessary design calculations for an integrated electromechanical system.

Course Learning Outcomes
At the completion of the course, students will be able to:

1. Understand how to integrate electromechanical components and software to perform designed tasks.
2. Model 1st and 2nd order mechanical and electrical systems.
3. Simulate behavior of a mechatronic system.
4. Perform case studies for real world mechatronic systems.
5. Design and implement a simple mechatronic system including all sensing and actuation, signal modification, and microprocessing.
1. Calculate the frequency response of a system.

MONTANA TECH

Appendix A: CCN Review

Does an equivalent course exist elsewhere in the MUS CCN Course Guide? https://ccn.mus.edu/search/

☐ Yes ☒ No

MONTANA TECH

Required approvals for all courses

11/17/2025

X 

Department Head
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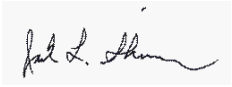
11/18/2025

X 

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X

CRC Chair

Approved at CRC meeting on Click or tap to enter a date.

X

Faculty Senate Chair

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MONTANA TECH

Notes

- Certificate programs are not automatically financial aid eligible. Please contact Director of Financial Aid for more information.
- All Graduate degrees must be approved by the Graduate Council before they can be considered by the CRC
- All Bachelor degree programs must conform to the OCHE requirements
- All Associate degree and certificate programs must conform to the OCHE requirements

Resources

- CIP Code
- SOC Code
- OCHE Policy on Course Modality
- OCHE Degree types
- All OCHE Academic Forms
    - Level I Changes
    - Level II Changes
- OCHE Academic Planning Calendar
- NWCCU Policy on Direct Assessment and Competency Based Education

Required Materials for Type of Request

- Catalog Editorial Change: This option should be chosen if only the proposal will only affect the curriculum worksheet and/or the program learning outcomes.
    - Complete all sections in the Catalog Information. Ensure that everything appears exactly as you want it to appear in the catalog.
    - No appendices are required
- Revise an existing minor: This option should be chosen if the coursework in an existing minor is changing
    - Complete all sections in the Catalog Information. Ensure that everything appears exactly as you want it to appear in the catalog.
    - No appendices are required
- Revise an existing academic program: This option should be chosen if the coursework in an existing academic program is changing and/or the mode of delivery is changing.
    - Complete all sections in the Program Description.
    - Complete all sections in the Catalog Information. Ensure that everything appears exactly as you want it to appear in the catalog.
    - Attach Appendix A – NWCCU Course Comparison Template
- Level I or Level II proposal: This option should be chosen if the change is part of a Level I or Level II request.
    - Complete all sections in the Program Description.
    - Complete all sections in the Catalog Information. Ensure that everything appears exactly as you want it to appear in the catalog.
    - Attach Appendix A – NWCCU Course Comparison Template
    - Attach Appendix B – required OCHE paperwork

Timeline

- Catalog Editorial Change:
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- Revise an existing academic program:
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    - Three weeks before CRC meeting – Request CFO complete the Fiscal analysis forms for Level II paperwork
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MONTANA TECH

Curriculum Change Form
Program Level Change Request

Program Information

Home Department Mechanical Engineering College Lance College of Mines and Engineering

Collaborating Department: Electrical Engineering

Effective Catalog edition: AY 26-27 Program Title: Mechatronics Minor

CIP Code: 14.4201 SOC Code: 17-2199.05

Degree Type: Minor Type of request Level I & Level II

Does this proposal affect other departments?

☐Yes, Provide a list of affected departments Click or tap here to enter text.

☒No

Assessment Leading to Request

Student course evaluations indicated a need for acknowledgement of effort in Mechanical Engineering Focus Areas. A minor in Mechatronics creates the transcript acknowledgement of student effort. Additionally, ABET assessment shows a deficiency in Mathematics for Mechanical Engineering that should be improved through the creation of an identified needed course in the minor to improve math-based modeling.

Program Description

Delivery Method (Please select all that apply)

☒Face-to-Face

☐Online

☐Remote Program (Online)

☐Online with Limited On-site Delivery Program (Online)

Provide the credit range required to complete the program

Min 18 Max 19

Method of Assessment

Will standard methods of assessment be used?

☒Yes ☐No

Will Direct Assessment be used instead of standard methods of assessment?

☐Yes ☒No

Will Competency-Based Education(CBE) be used instead of standard methods of assessment?

☐Yes ☒No

What percentage of the total degree requirements are new credits? 100

MONTANA TECH

Catalog Information

Program Learning outcomes

Students completing the Mechatronics Minor will be able to:

1. **Apply interdisciplinary knowledge** of mechanical systems, electronics, sensors/actuators, and control theory to design and analyze integrated mechatronic systems. *(ABET 1)*
2. **Conduct experiments and use engineering tools**—including microcontrollers, PLCs, instrumentation, and test equipment—to collect, interpret, and apply data to system design and troubleshooting. *(ABET 6)*
3. **Design and implement solutions** that integrate hardware and software components to meet specified performance, safety, and functional requirements. *(ABET 2)*
4. **Function effectively on multidisciplinary teams**, contributing to project planning, task coordination, documentation, and communication of technical results. *(ABET 5 & 3)*
5. **Identify and address engineering problems** involving automation, control, and system integration in manufacturing, energy, or agricultural applications. *(ABET 1 & 7)*
6. **Demonstrate professional and ethical responsibility** in laboratory practice, system testing, and engineering decision-making. *(ABET 4)*
7. **Communicate technical information effectively**, including system designs, test results, and project recommendations, to both technical and nontechnical audiences. *(ABET 3)*

Curriculum worksheet (by term)

Click or tap here to enter text.

Course	Title	Credits
EELE 201	Circuits I	3
EELE 202	Circuits I Lab	1
EGEN 304	Dynamic Systems Modeling	3
CSCI 117	Introduction to MatLab	3
	OR	
CSCI 135	Fundamentals of Computer Science	3
EELE 371	Microprocessor HW and SW Systems	4
	OR	
ESOF 322	Software Engineering	3
EELE 321	Introduction to Feedback Controls	3
	OR	
CSCI 361	Computer Architecture	3
EGEN 465	Mechatronics Design	3
Total		19 or 20

Attachments

- Appendix A: NWCCU Substantive Change Course Comparison Template https://nwccu.app.box.com/s/93rqtj6atfal5mazrlac5onsqhhz1130
- Appendix B: Required Level I or Level II paperwork

MONTANA TECH

Required approvals for all program changes	For graduate level programs only
X _____ Department Head	X _____ Dean of the Graduate School
X _____ College Dean	X _____ Graduate Council Chair
X _____ CRC Chair Approved at CRC meeting on Click or tap to enter a date.	Approved at Graduate council meeting on Click or tap to enter a date.
X _____ Faculty Senate Chair Approved at Senate meeting on Click or tap to enter a date.	

MONTANA TECH

Type of Request

- Propose a new course
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Timeline

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  - One week before CRC meeting – Submit proposal to CRC chair
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MONTANA TECH

Curriculum Change Form AY 25-26
Course Level Change Request

Course Information

Department Mechanical Engineering College Lance College of Mines and Engineering

Effective Term: AY 26/27 Course Title: Introduction to Welding Engineering

Does this proposal affect other departments?
☐Yes, Provide a list of affected departments Click or tap here to enter text.
☒No

Proposal type: Revise an existing course

Assessment Leading to Request
With the way the course is currently taught, the current prerequisite (PHSX 235) is not appropriate and presents an unnecessary barrier to students registering for the course. A more appropriate co-requisite is EGEN 201 Statics.

Course Description

Course Prefix: EWLD Course Number: 314

Credits 3
Hours: Lecture 3 Lab 0

Repeatable
☒ Yes ☐ No

Prerequisites
None

Corequisites (include course codes and titles)
EGEN 201 Engineering Mechanics Statics

Semesters Offered (select all that apply)
☐Fall ☒Spring ☐Summer ☐Intermittent

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

Course Learning Outcomes
This course provides the students the tools to:

1. understand the basic terminology of welding engineering
2. know the major welding processes and fundamental principles of operation
3. describe the influence of welding processes and on material structure and properties.
4. understand basic welding design concepts related to processes, materials and discontinuities
5. identify the need for and operation of basic nondestructive evaluation processes.

Appendix A: CCN Review

Does an equivalent course exist elsewhere in the MUS CCN Course Guide? https://ccn.mus.edu/search/

☐ Yes ☐ No

MONTANA TECH

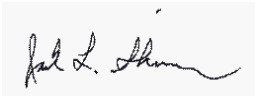
Required approvals for all courses

12/4/2025

X 

Department Head
Signed by: 87af6ad9-1a3c-4ed0-a298-cad35532c3eb

12/4/2025

X 

College Dean
Signed by: 99c9f35a-6405-46ba-b389-f72edda773ee

X

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MONTANA TECH

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MONTANA TECH

Curriculum Change Form
Program Level Change Request

Program Information

Home Department Mechanical Engineering College Lance College of Mines and Engineering

Collaborating Department: N/A

Effective Catalog edition: AY 26-27 Program Title: Welding Engineering Minor

CIP Code: 14.9999 SOC Code: 17-2199.00

Degree Type: Minor Type of request Level I & Level II

Does this proposal affect other departments?

☒Yes, Provide a list of affected departments Metallurgical and Materials Engineering

☐No

Assessment Leading to Request

Welding engineering is currently offered only as a mechanical engineering focus area and no mechanism exists to grant a formal credential in welding engineering. Offering a minor in welding engineering will enable students in any engineering discipline offered at Tech to earn a credential in welding engineering that is documented on their final transcript. The welding engineering minor will enhance graduates' employability within the welding engineering field because they will have a named credential in welding engineering.

Students and prospective employers (e.g. John Deere) have indicated support for the minor. The minor was created using the body of knowledge for welding engineers specified in the American Welding Society (AWS) B5.16:2025 *Specification for the Qualification of Welding Engineering Personnel*.

Program Description

Delivery Method (Please select all that apply)

☒Face-to-Face

☐Online

☐Remote Program (Online)

☐Online with Limited On-site Delivery Program (Online)

Provide the credit range required to complete the program

Min 17 Max 17

Method of Assessment

Will standard methods of assessment be used?

☐Yes ☒No

Will Direct Assessment be used instead of standard methods of assessment?

☒Yes ☐No

Will Competency-Based Education(CBE) be used instead of standard methods of assessment?

☐Yes ☒No

What percentage of the total degree requirements are new credits? 100

MONTANA TECH

Catalog Information

Program Learning outcomes

The welding engineering minor will enable students to:

1. Apply engineering principles to the design of welded connections.
2. Understand the welding metallurgy of ferrous and non-ferrous metals.
3. Have a working knowledge of welding and allied processes.
4. Understand the principles and practices related to weld inspection and quality control/quality assurance systems.

Note: Intended only for students graduating with an engineering major

Curriculum worksheet (by term)

Click or tap here to enter text.

Course	Title	Credits
EWLD 314	Intro to Welding Engineering	3
EWLD 340	Welding Process Applications	2
EWLD 341	Welding Process Applications Lab	1
EMAT 351	Fundamentals of Materials	2
EMAT 353	Microstructural Interpretation	1
EWLD 440	Design of Welded Connections	2
EWLD 476	Nondestructive Evaluation	3
EWLD 488	Metallurgy of Welds	3
Total		17

Attachments

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- Appendix B: Required Level I or Level II paperwork

MONTANA TECH

Required approvals for all program changes

12/4/2025

X 

Department Head
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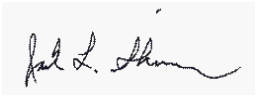
12/4/2025

X 

College Dean
Signed by: 99c9f35a-6405-46ba-b389-f72edda773ee

X

CRC Chair

Approved at CRC meeting on Click or tap to enter a date.

X

Faculty Senate Chair

Approved at Senate meeting on Click or tap to enter a date.

MONTANA TECH

Type of Request

- Propose a new course
  - Complete all sections in the Course Description. Ensure that everything appears exactly as you want it to appear in the catalog
  - Complete Appendix A: CCN Review (Consult with the registrar if you have questions)
- Revise an existing course
  - Complete all sections in the Course Description. Ensure that everything appears exactly as you want it to appear in the catalog

Timeline

- Propose a new course
  - One week before CRC meeting – Submit proposal to CRC chair
- Revise an existing course
  - One week before CRC meeting – Submit proposal to CRC chair

MONTANA TECH

Curriculum Change Form AY 25-26
Course Level Change Request

Course Information

Department Mathematical Sciences College College of Letters Sciences and Professional Studies

Effective Term: AY 26/27 Course Title: Technical Mathematics

Does this proposal affect other departments?
☒Yes, Provide a list of affected departments Highlands
☐No

Proposal type: Revise an existing course

Assessment Leading to Request
The content in M 111 includes the necessary topics from M 065, so it is not necessary to have M 065 as a prerequisite for M 111.

Course Description

Course Prefix: M Course Number: 111

Credits 3
Hours: Lecture 3 Lab 0

Repeatable
☐ Yes ☒ No

Prerequisites
Required test scores: ACT 20-21; SAT 25.5-27; SAT section score 520-540; ALEKS 30-45: or College Success 103-114.
Co-Req M 111L required with test scores: ACT 18-19; SAT 24-25; SAT section score 480-510; ALEKS 14-29; or College Success 90-102

Corequisites (include course codes and titles)
none

Semesters Offered (select all that apply)
☒Fall ☒Spring ☐Summer ☐Intermittent

Course Description
This course presents basic mathematical topics as they are applied in a technical program. Topics covered include percent, ratio proportion, formula evaluation, basic algebra and geometry concepts, trigonometry and measurement are developed and integrated in a technical setting.

Course Learning Outcomes

- Utilize and apply mathematical operations, measurement (English and Metric Systems), introductory geometric principles and applied algebra into technical applications in academic and workplace situations;
- Read, interpret, and produce solutions to applications at the introductory technical mathematics level;
- Apply ratio and proportion concepts to introductory technical mathematical situations;

- Apply appropriate technology in a mathematical situation;
- Determine the validity of results and data;
- Solve any component of a right triangle with any two components given.

Appendix A: CCN Review

Does an equivalent course exist elsewhere in the MUS CCN Course Guide? https://ccn.mus.edu/search/

☐ Yes ☐ No

MONTANA TECH

Required approvals for all courses

11/20/2025

X 

Department Head
Signed by: 04069342-0d64-4892-ab60-9b73a4c7a982

12/9/2025

X Michele Hardy by C.Roos

College Dean
Signed by: fcf19446-a01d-4124-8e78-c18dd52b571d

X

CRC Chair

Approved at CRC meeting on Click or tap to enter a date.

X

Faculty Senate Chair

Approved at Senate meeting on Click or tap to enter a date.

MONTANA TECH

Type of Request

- Propose a new course
  - Complete all sections in the Course Description. Ensure that everything appears exactly as you want it to appear in the catalog
  - Complete Appendix A: CCN Review (Consult with the registrar if you have questions)
- Revise an existing course
  - Complete all sections in the Course Description. Ensure that everything appears exactly as you want it to appear in the catalog

Timeline

- Propose a new course
  - One week before CRC meeting – Submit proposal to CRC chair
- Revise an existing course
  - One week before CRC meeting – Submit proposal to CRC chair

MONTANA TECH

Curriculum Change Form AY 25-26
Course Level Change Request

Course Information

Department Mathematical Sciences College College of Letters Sciences and Professional Studies

Effective Term: AY 26/27 Course Title: Co-Requisite support for Technical Mathematics

Does this proposal affect other departments?
☒Yes, Provide a list of affected departments Highlands
☐No

Proposal type: Revise an existing course

Assessment Leading to Request
This support lab has been listed under the temporary number M 191. We would like to assign this course the number M 111L.

Course Description

Course Prefix: M Course Number: 111L

Credits 1
Hours: Lecture 0 Lab 1

Repeatable
☐ Yes ☒ No

Prerequisites
Required test scores: ACT 18-19; SAT 24-25; SAT section score 480-510; ALEKS 14-29; or College Success 90-102

Corequisites (include course codes and titles)
M 111

Semesters Offered (select all that apply)
☒Fall ☒Spring ☐Summer ☐Intermittent

Course Description
This course provides support in achieving the M 111 learning outcomes. Students that place into this course should register for both M 111 and M 111L.

Course Learning Outcomes

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

MONTANA TECH

Appendix A: CCN Review

Does an equivalent course exist elsewhere in the MUS CCN Course Guide? https://ccn.mus.edu/search/

☐ Yes ☐ No

MONTANA TECH

Required approvals for all courses

11/20/2025

X 

Department Head
Signed by: 04069342-0d64-4892-ab60-9b73a4c7a982

12/9/2025

X Michele Hardy by C.Roos

College Dean
Signed by: fcf19446-a01d-4124-8e78-c18dd52b571d

X

CRC Chair

Approved at CRC meeting on Click or tap to enter a date.

X

Faculty Senate Chair

Approved at Senate meeting on Click or tap to enter a date.

Montana Technological University Naming of Property, Programs, and Campus Areas

Subject:
Section 1000 - Physical Plant

Number:
1004

Effective date:
November 1, 2025

Review date:
November 1, 2028

Responsible Party:
Vice Chancellor of Administration and Finance

Historical versions: Link if applicable.

Introduction and Purpose:

This policy governs the naming of Montana Technological University property, programs, and campus areas per Montana Board of Regents Policy 1004.1.

Authority:

The Vice Chancellor of Administration and Finance is responsible for managing this policy and for maintaining procedures related to this policy.

University Policy:

The Board of Regents of the Montana University System considers the naming of property, programs, and campus areas in honor of a living or deceased individual, corporation, foundation, or organization to be one of the highest and most distinct honors that it can bestow. All naming honors by and for Montana Technological University shall be in accordance with BOR Policy 1004.1.

I. All requests for naming buildings, colleges, schools, departments, centers, athletic stadiums, athletic fields, auditoriums, and theaters with seating for 500 or more, and campus areas which have historic distinction to the campus must first be submitted to the Vice Chancellor for Administration and Finance for review and guidance. The proposal will then be submitted to the Chancellor of Montana Technological University. If approved, the Chancellor

will submit the proposal to the President of the University of Montana whom, if approved, will submit to the Montana Board of Regents for final approval.

II. All proposals for naming classrooms, conference rooms, auditoriums, and theatres of less than 500 capacity, internal libraries, rooms, hallways, floors, and features, as well as other enclosed or conditioned space(s) within buildings shall be submitted first to the Vice Chancellor of Administration for review and guidance; and then to the Chancellor for approval, with agreement by the President of the University of Montana.

III. All proposals for naming academic programs or units subordinate to colleges, schools, departments, and centers, shall be submitted first to the Provost and Executive Vice Chancellor for review and guidance. The BOR Academic Proposal Review process will be followed as required and once approved accordingly, the proposal will go to the Chancellor for approval, with agreement by the President of the University of Montana.

IV. Per BOR Policy 1004.1 Naming Honors shall specify the term that the name will exist or specify that it is in perpetuity. Perpetuity means the useful life of the property or program or as long as the program or property has not substantially changed. Naming in perpetuity should only be considered for transformative gifts. Exceptions may exist and must be approved by the Board.

V. Per BOR Policy 1004.1, where naming authority lies with the Board, the Board may remove the name under certain circumstances. The Chancellor or University of Montana President, where naming authority lies with the Chancellor or University of Montana President, may remove the name under the same circumstances as listed in BOR Policy 1004.1.

VI. Naming a property or program based on a charitable gift to the campus shall be done in accordance with the Montana Technological University Foundation Gift Acceptance Policy as approved by the Montana Technological University Cabinet.

Procedures:

The Vice Chancellor for Administration and Finance will manage all naming requests for property and shall establish procedures accordingly. The Provost and Executive Vice Chancellor will manage all naming requests for academic programs and shall establish procedures accordingly. All procedures will include shared governance involvement.

_____ _____

Adopted by: (Chancellor) Date

Montana Technological University Policy

Subject:
Section 400 - Research and Public Service

Policy:
Policy on Academic Year Course Buyout and Incentive Compensation

Policy Number:
420

Revised:
TBD

Effective date:
TBD

Review date:
TBD

Responsible Party:
Research Office

Introduction and Purpose:

Montana Technological University supports research and external grant funding as essential to its academic and financial vitality. To encourage continued pursuit of externally funded projects, this policy establishes course buyout procedures with an incentive compensation structure for faculty engaged in such activities.

This policy defines *Institutional Base Salary (IBS)* in compliance with CFR 200.430 and outlines procedures for research incentive compensation, commonly known as Research Buyout. Other forms of overload compensation (e.g., per Section 10.4 of the CBA) are not addressed in this policy.

Policy:

Institutional Base Salary (IBS)

Definition

IBS is the annual compensation paid by the University for an employee's appointment, covering all duties including research, teaching, service, and administration.

IBS Guidelines

- Established Annually: Defined in the annual contract per the CBA or MUS Staff Compensation Plan.
- No Substitution: IBS may not increase as a result of replacing University salary with sponsored project funds.

Faculty may use funding from sponsored projects to buy out of teaching duties with **prior approval** of the Department Head, and Dean. Approval must be obtained and the buyout documented BEFORE the start of the academic term involved. Such buyouts are budgeted and conducted on the basis of a course load of 15 credits per semester (30 credits per academic year). The number od credits to be bought out should be divided by 15 for a semester to determine the percentage FTE of the buyout for the semester. The buyout percentage will be multiplied by the faculty member's IBS for the period to determine the salary budget required for the buyout. The faculty member will receive the calculated percentage(s) of salary from the grant(s), and the remaining percentage of salary (adding to 100%) from the faculty member's academic position.

The grant budget(s) must include the buyout salary amount along with the appropriate additional percentage of benefits. The Office of Sponsored Programs will prepare a spreadsheet documenting the buyout and the associated allocations.

Incentive Compensation for Externally Funded Research

Montana Tech offers incentive compensation for faculty who secure external funding for Research Buyouts during the Fall and Spring semesters only. Summer compensation is based on IBS and not eligible for incentives.

Eligibility and Purpose

- Incentive compensation applies only to externally funded Research Buyouts (internal funds such as IDC are excluded).
- Buyouts are calculated based on IBS, assuming a 15-credit full-time workload.
- The program incentivizes faculty to pursue and sustain sponsored research.

Compensation Structure

- Research Buyouts replace a portion of faculty salary typically funded by the University with grant funds.
- Salary savings to the University are distributed as follows:
    - 60% retained by Montana Tech for adjunct hiring and administrative costs
    - 40% paid to the faculty member as an incentive

- Incentive payments will be issued prior to the Summer Semester following the academic year.

Sponsored Projects and Effort Reporting

When requesting salary support from a sponsored project—or reporting committed effort—the amount must be calculated using the employee's IBS. The proportion of effort multiplied by IBS determines the salary to be charged or cost-shared.

Procedures:

Faculty must submit a written request for a Research Buyout before the start of the semester. The request must include:

- Number of course hours for Buyout
- Funding source (grant or sponsored project)
- Summary of proposed research activities and timeline

The request must be approved by the Department Head and Dean.

The Assistant VCR of the Office of Sponsored Programs will:

- Verify the availability of funds from the specified grant or sponsored source

Internal control considerations, if applicable:

Faculty compensation for Federal Awards will be at the Institutional Base Salary (IBS), as defined by the relevant statute governing cost principles on federal awards (CFR 200, Part 200.430, paragraph (h)(2)). Specifically, "IBS is defined as the annual compensation paid by an Institution of Higher Education for an individual's appointment, whether that individual's time is spent on research, instruction, administration, or other activities. IBS excludes any income that an individual earns outside of duties performed for the IHE.

This policy is compliant with Extra Service Pay Considerations of the same above federal statute (CFR 200, Part 200.430, paragraph (h)(4)).

_____ _____

Adopted by: (Chancellor) Date

Risser, Scott

From: Risser, Hilary
Sent: Sunday, January 11, 2026 4:24 PM
To: Risser, Scott; Hardy, Michele; Burke, Tammy; Skinner, Jack
Cc: Elgren, Timothy
Subject: Information to share

Hello everyone,
Happy New Year. I would appreciate it if you would share the following message with Faculty Senate and Department Heads.
Best,
Hilary

As we begin the spring semester, I want to share some important updates on accreditation with the faculty.

Ad Hoc Visit
This spring, we have an ad hoc visit on April 6th, 2026. The visit will be a single day. When the visit schedule is finalized, I will share it with the campus.

Academic Program Review Template Revision
We are currently revising the Academic Program Review Template. There are two primary goals we are trying to accomplish in this revision process:

1. To allow programs with external accreditation to use the same formatting that they use for their external accreditor
2. To remove redundancies from the form

I am asking faculty members involved with accreditation of any Academic Program to complete the following survey by February 1st: https://montanatech.co1.qualtrics.com/jfe/form/SV_etSLrYT6tYtwpro

The feedback provided will be used to finalize the Academic Program Review Template. That template will be used for all Academic Degree Program Reviews next year.

Training for Academic Program Review
One of the criticisms we faced in our last year seven review concerned the uneven quality of our program reviews. In an effort to address this concern, there will be training opportunities for faculty members who wish to learn more about Academic Program Review. I have also created a Canvas course to house the training materials (including recordings of live trainings). Every faculty member on campus has been enrolled in this course. Details on the training opportunities are provided below.

Writing Program Learning Outcomes

- Date: January 28
- Time: 3:00-4:15PM
- Room: CBB 001
- Who should attend this workshop?
    - This workshop is designed for faculty members who wish to learn more about accreditation and programs that want to revise their program learning outcomes and/or assessment plans.

Creating Curriculum Maps

- Date: February 25
- Time: 3:00-4:15PM
- Room: CBB 001
- Who should attend this workshop?
    - All academic programs will be required to include a curriculum map in their Academic Program Review next year. This workshop is designed for all faculty members who will participate in drafting a curriculum map.

Assessment Plans

- Date: March 25
- Time: 3:00-4:15PM
- Room: CBB 001
- Who should attend this workshop?
    - This workshop is designed for faculty members who wish to learn more about accreditation and programs that want to revise their assessment plans.

Additional workshops will be scheduled at Highlands. I will share those dates once they are finalized. If your department or program is interested in working with me on an individual basis, please let me know. I am happy to present any of these workshops or any additional assessment topics of interest to your program. I hope everyone has a wonderful spring semester.

Best Wishes,
Hilary

Montana University System

REQUEST TO PLAN FORM – ACADEMIC PROGRAM

ITEM XXX-XXX-XXXXX **Meeting Date**

Item Name

Program Title:	**PhD Energy Engineering and Science**	Planned 6-digit CIP code:	**14.xxxx**
Campus, School/Department:	**Montana Technological University, Lance College of Mines and Engineering**	Expected Final Submission Date:	**December 2025**
Contact Name/Info:	**Foued Badrouchi, fbadrouchi@mtech.edu, 406-496-4479** **Jack Skinner, JSkinner@mtech.edu, 406-496-4460**		

This form is meant to increase communication, collaboration, and problem-solving opportunities throughout the MUS in the program/center/institute development process. The completed form should not exceed 2-3 pages. For more information regarding the program/center/institute approval process, please visit http://mus.edu/che/arsa/academicproposals.asp.

1) Provide a brief description of the new program.

Montana Technological University proposes the creation of a new Doctor of Philosophy (Ph.D.) in Energy program. This modular and interdisciplinary program reflects Montana Tech's longstanding leadership in the energy sector and leverages existing strengths across departments.

The Ph.D. in Energy Engineering and Science will initially offer three specialization options with the responsible departments in the LCME listed in parentheses:

- Power Systems and Technologies (Electrical Engineering)
- Energy Conversion and Applications (Mechanical Engineering)
- Petroleum and Subsurface Engineering (Petroleum Engineering)

Each specialization will be administered by its respective department, allowing autonomy in curriculum development, faculty assignments, and admissions decisions. The modular structure ensures flexibility and relevance across diverse energy disciplines while maintaining academic rigor and research excellence.

In both tracks, students will complete a combination of coursework and research/dissertation credits. A qualifying examination will be required after completing initial coursework. This exam will assess students on both shared interdisciplinary core content and their chosen area of specialization. The students will also have a comprehensive examination which is an oral defense of their research proposal once sufficiently developed.

The program aims to prepare highly skilled researchers and professionals equipped to address evolving energy challenges in Montana and beyond.

1.a. How many total credits will be required for the degree? How many credits in the major/minor?

The program will follow the 60-credit framework like the MUS Material Science and Engineering PhD program with 20 core curriculum course credits and 32 total course credits required along with 28 research credits. Up to 24 credits from a Masters degree will be accepted.

Montana University System

REQUEST TO PLAN FORM – ACADEMIC PROGRAM

2) Describe the need for the program. Specifically, how the program meets current student, state, and workforce demands. (Please cite sources).

Montana Tech's proposed Ph.D. in Energy addresses both local and national needs in workforce development, research, and talent retention. The program aligns with Montana Tech's strengths in applied energy engineering and responds to urgent labor market trends.

Nationally**,** clean energy jobs grew by 4.2% in 2023, adding over 142,000 jobs and outpacing overall job growth (Utility Dive, Reuters, Building Performance Association). In total, over 250,000 energy sector jobs were added that year, with 56% in clean energy fields (S&P Global).

Montana is also seeing major federal investment. The U.S. Department of Energy awarded up to $700 million to the state (via the GRIP program) for power grid reliability and modernization (Montana Free Press, commerce.mt.gov, North Dakota Monitor).

These shifts create a growing need for advanced training and local research capacity in areas like energy systems, power generation, and grid integration. As confirmed by the Montana Energy Office, strategic growth areas include geothermal, storage, carbon mitigation, and energy infrastructure.

Finally, this program meets a clear student demand. Montana Tech's master's programs in Petroleum, Mechanical, and Electrical Engineering enroll high-performing students, many of whom express interest in doctoral study but lack a local option. A Ph.D. in Energy will provide a pathway to retain these students, attract external applicants, and position Montana Tech as a regional hub for advanced energy research and innovation (cleanenergytransition.org).

3) Describe how the program fits with the institutional mission, strategic plan, and the existing MUS and institutional portfolios (refer to the most recent institutional Academic Priorities and Planning Statement. https://www.mus.edu/che/arsa/AcademicPlanningAndPriorities/academic-priorities.html).

The proposed Ph.D. in Energy program aligns strongly with both MUS priorities and Montana Tech's strategic objectives in the following ways:

- **Expanding Graduate Education Capacity**: MUS is committed to expanding graduate education to fuel economic development and grow the research enterprise—the Ph.D. in Energy contributes directly to this goal by increasing Ph.D.-level training in a high-demand, STEM-focused field.

- **Workforce & Economic Development**: MUS objectives emphasize developing high-value jobs and aligning academic programs with workforce needs. This program responds by preparing doctoral-level energy professionals to meet local and national workforce demands in energy and infrastructure.

- **Programs of Distinction at Montana Tech**: The institutional strategic plan calls for strengthening interdisciplinary clusters—specifically in energy, technology, natural resources, and workforce—and expanding industry partnerships and endowed expertise. The Ph.D. in Energy would serve as a flagship Program of Distinction in energy, anchored by cross-departmental collaboration and aligned with Tech's designation as a Special Focus STEM Institution.

Montana University System
REQUEST TO PLAN FORM – ACADEMIC PROGRAM

- **Institutional Mission Alignment**: Montana Tech's mission emphasizes "developing leaders and advancing science, engineering, and technology ... benefiting humanity while meeting the changing needs of society." The Ph.D. in Energy directly supports this mission by training leaders equipped to address energy challenges via innovation and applied research

4) Review the MUS academic degree program inventory for similar, adjacent, and/or preparatory programs (https://www.mus.edu/findaprogram/).

a. Describe any opportunities for collaboration you have identified or initiated either within the institution or between MUS institutions (i.e. articulation, course-sharing academic programs and creating pathways between degrees). Include potential contacts and their institutional affiliation.

Montana Tech is exploring internal collaboration with Environmental Engineering, Mining Engineering, and MBMG, and external partnerships with MSU (geothermal and energy systems) and UM (environmental modeling). These may involve course sharing and joint research.

b. What are current enrollment numbers in similar programs for the last three academic years?

Montana Tech currently offers M.S. degrees in Petroleum, Mechanical, and Electrical Engineering, which collectively enroll 13 to 23 students over the last three years. While exact statewide Ph.D. enrollment data in energy-specific fields is limited, no MUS institution currently offers a modular, interdisciplinary Ph.D. program specifically focused on Energy. This proposed program would fill that gap and support students who wish to continue beyond the master's level locally.

c. Describe any significant new financial resources (faculty, staff, facilities, and/or curricula) needed to launch and sustain the program.

To support delivery of the proposed curriculum, the program will require modest new instructional personnel capacity beyond existing faculty commitments. Instructional needs include three 3-credit core courses, two seminar courses, and three 3-credit module courses in each of three specialization modules (nine module courses total).
At steady state, this instructional load is equivalent to approximately 3.0–4.0 FTE faculty, distributed across participating departments. This includes:

- 1.0–1.5 FTE to support the interdisciplinary core curriculum and seminars, and
- Approximately 1.0 FTE per specialization module (Electrical Engineering, Mechanical Engineering, and Petroleum Engineering) to deliver module-specific coursework and supervise doctoral research.

Initial delivery may rely partially on existing faculty, but new tenure-track or research-active faculty lines will be required to ensure sustainability, research supervision capacity, and timely course offerings as enrollment grows.
Additionally, a power electronics module will be needed for the current Power Lab on campus to support instruction and research.

Signature/Date
Chief Academic Officer:

Montana University System

REQUEST TO PLAN FORM – ACADEMIC PROGRAM

Chief Executive Officer:
Flagship Provost*:
Flagship President*:
*Not applicable to the Community Colleges.

Create a new Course Prefix for these called EES or something similar

Core Curriculum that all PhD students will take

EES 500/500W Survey of Energy Engineering and Science

This seminar course provides an interdisciplinary overview of energy engineering and science, introducing students to major energy systems, technologies, and research areas spanning power systems, energy conversion, and subsurface energy engineering. Through faculty-led seminars, guest lectures, and student-led discussions, students examine current challenges, emerging technologies, and research methods in the energy sector. Emphasis is placed on understanding the technical, economic, environmental, and societal dimensions of energy systems, as well as research ethics and professional practice. The course supports doctoral students in developing a broad perspective of the energy field and identifying potential research directions.

EES 501 Energy Systems Fundamentals

This course provides an advanced foundation in energy systems, emphasizing the physical principles governing energy generation, conversion, transmission, and utilization. Topics include energy resources, energy balances, thermodynamic principles, and system-level performance metrics. Students develop the ability to analyze complex energy systems using quantitative methods and evaluate technical, environmental, and economic trade-offs in energy system design and operation.

EES 502 Managing Energy Resources and Policy

This course examines the management of energy resources within regulatory, economic, environmental, and societal frameworks. Topics include energy policy analysis, regulatory structures, sustainability, lifecycle assessment, and ethical considerations in energy decision-making. Students develop skills to evaluate policy impacts on energy system design and deployment and to communicate technical analyses to diverse stakeholders in professional and public settings.

EES 503 Mathematical Modeling of Energy Systems

This course focuses on advanced mathematical and computational techniques for modeling energy systems. Topics include deterministic and stochastic modeling, optimization, numerical methods, and uncertainty analysis applied to energy generation, storage, and distribution systems. Students develop and validate models to predict system behavior, support design decisions, and inform research in complex, multidisciplinary energy systems.

Power Systems and Technologies Module

EES 510/EELE 551 Power Electronics

Common power electronic devices are studied, and their design applications are developed. Devices studied include power diodes, thyristors, transistors, and gating devices. Common design applications include DC-DC, DC-AC, AC-DC, and AC-AC converters and power supplies. The lab component will include the use of design computer software and actual circuit construction.

EES 511/EELE 554 Power System Operation and Control

An introduction to power system operations and control, including the study of load-frequency control, voltage stability and control, economic dispatch, and integration of renewable resources. Power system stability is also introduced.

EES 512/EELE 555 Power System Dynamics and Control

Advanced study of electric three-phase power system dynamic modeling, analysis, and control. Includes synchronous generators, turbine speed-governors, excitation systems, inverter-based resources, electromechanical (transient and small-signal) stability, computer simulation and analysis.

Energy Conversion and Application Module

EES 520/EMEC 520 Thermodynamics of Energy Systems

This course provides advanced treatment of thermodynamic principles as applied to modern energy systems. Topics include the first and second laws of thermodynamics, exergy analysis, thermodynamic cycles, and energy conversion processes. Emphasis is placed on evaluating system efficiency, irreversibilities, and sustainability metrics. Students apply thermodynamic analysis to research problems involving conventional and emerging energy technologies.

EES 521/EMEC 521 Energy Systems Engineering

This course deals with the engineering design and integration of complex energy systems. Topics include systems engineering methods, multi-domain energy systems, techno-economic analysis, reliability, and risk assessment. Students synthesize knowledge from multiple disciplines to design, evaluate, and optimize energy systems while considering constraints related to performance, cost, safety, environmental impact, and societal needs.

EES 522/EMEC 522 Energy System Dynamics

This course focuses on dynamic behavior and control of energy systems. Topics include transient analysis, dynamic modeling, stability, feedback control, and system response to disturbances. Applications include power systems, thermal systems, and integrated energy networks. Students develop advanced analytical and simulation skills to assess system performance and resilience under varying operational conditions.

Petroleum and Subsurface Engineering Module

EES 530/PET 501 Advanced Drilling

The study of special drilling topics and new technology applications in drilling engineering. Guest lecturers from industry will be invited to present the latest in technology and case history information. Students are assigned to write reports demonstrating an understanding of the various topics studied.

EES 531/PET 504 Advanced Reservoir Engineering

This course builds on the fundamental rock and fluid property concepts to derive and apply material balance equations, fluid flow in porous media equations, and pressure transient theory.

EES 532/PET 555 Reservoir Geomechanics

This interdisciplinary course encompasses the fields of rock mechanics, structural geology, and petroleum engineering to address a wide range of geomechanical problems that arise during the exploitation of oil and gas reservoirs.

Summary Tables

Subject	Name	Credits	Cross-listed	New
Core Curriculum				
EES 500	Survey of Energy Engineering and Science	1		Yes
EES 500W	Survey of EES Writing	1		Yes
EES 501	Energy Systems Fundamentals	3		Yes
EES 502	Managing Energy Resources and Policy	3		Yes
EES 503	Mathematical Modeling of Energy Systems	3		Yes
Power Systems and Technologies Module				
EES 510	Power Electronics	3	EELE 551	No
EES 511	Power System Operation and Control	3	EELE 554	No
EES 512	Power System Dynamics and Control	3	EELE 555	No
Energy Conversion and Application Module				
EES 520	Thermodynamics of Energy Systems	3	EMEC 520	Yes
EES 521	Energy Systems Engineering	3	EMEC 521	Yes
EES 522	Energy System Dynamics	3	EMEC 522	Yes
Petroleum and Subsurface Engineering Module				
EES 530	Advanced Drilling	3	PET 501	No
EES 531	Advanced Reservoir Engineering	3	PET 504	No
EES 532	Reservoir Geomechanics	3	PET 555	No

Rubric #'s	Course Topic Area
x00-x09	Introduction, Fundamentals
x10-x19	Power Systems and Technologies
x20-x29	Energy Conversion and Application
x30-x39	Petroleum and Subsurface Engineering
x40-x79	Reserved for Future use
x80-x89	Pre-Exam Dissertation
x90-x99	Dissertation