Colorado School of Mines – GRADUATE COUNCIL MEETING MINUTES
February 5, 2:00 – 3:00 pm, GC224/Zoom

Attendees:

Voting Members: 22 total (12 - majority needed for quorum). Quorum was present.

P	John Spear (Chair)		Danielle Ostendorf (LB)	P	Andy Osborne (NSE)	P	Uwe Greife (PH)
P	Ian Lange (EB)	P	Bettina Voelker (CH)	P	Jaeheon Lee (MN)	P	Pejman Tahmasebi (PE)
P	Jeff Shragge (GP)	P	Ebru Bozdag (AMS)	P	Adrienne Marshall (HSE)		Jim Ranville (GC)
P	Mehmet Belviranli (CS)	P	Adrianne C. Kroepsch (HASS)	P	Ryan Venturelli (GE)		
P	Lori Tunstall (CEE)		Nikki Farnsworth (CBE)		Ellie Miller (GSG)		
P	Rajavasanth Rajasegar (ME)	P	Yamuna Phal (EE)	P	Kip Findley (MME)		

Other Regular Attendees and Guests

P	Carl Frick (OGS)		Carolyn Freedman (OGS)	P	Jenny Briggs (OGS)		Roxane Aungst (OGS)
	Wendy Adams (HNRS)	P	D. Scott Heath (RO)	P	Paul Myskiw (RO)	P	Colin Schneider (RO)
P	Sam Spiegel (Mines Online)		Suzanne Beach (Payne)	P	Kristeen Serracino (AA)		Richard Krahenbuhl (GP)
P	Jon Johnson (Mines Online)		Peter Concepcion (Grad Admissions)		Luke Contreras (Grad Admissions)		Kelsie Diaz (CS)
	Cadi Gillette (IGP)		Rachel McDonald (IGP)				

Special Guest(s): Alison Bodor, Angel Abbud Madrid, Frankie Zhu, Wendy Fisher, Zibo Wang, Josue Campos do Prado, Donna Bodeau, Dong Chen

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Welcome John Spear

Briefings and Information Items

Office of Graduate Studies Carl Frick/Jenny Briggs

- **Question:** K. Findley asked, what are graduate recruiting numbers for the Fall?
- **Answer:** C. Frick answered that the number of applicants so far is looking strong with a significant increase in PhD applicants. Mines recently increased the marketing budget for digital advertising, so the number of applicants has doubled (~$50,000 for each program). The main priority has been on programs that have high non-thesis master's enrollment (ETM, ME, EE, CS, and Space Resources) and improving Google SEO.

- **Question:** T. Voelker asked, is this money no longer used to assist departments with recruiting?
- **Answer:** C. Frick answered graduate student recruiting is under a 4-person team which has not had a diminished budget. Admissions put out a request to the portfolio deans to see if departments wanted to take over Grad Visit days and the overwhelming response was yes. C. Frick can look into this and provide additional information.

- **Question:** A. Kroepsch asked, is OGS tracking the number of students who may have lost their graduate student funding due to the recent executive orders on DE&I? How widespread is this problem on Mines' campus?
- **Answer:** Although there has been word of funds being pulled, this hasn't quite happened yet. There was an announcement that things would be delayed or paused but then it became unclear. OGS will look into how many graduate students are being affected by this.
- **Question:** R. Venturelli asked, how is money awarded to the institution for the GRFP program?
- **Answer:** J. Briggs answered it is awarded in block over multiple years. Mines is currently in year

2 of a 5-year award, therefore, all current cohorts should not be affected. However, there is uncertainty regarding what changes could mean especially for those who just applied for GRFPs this past Fall. OGS does oversee some other diversity related funds, but they are not tied to federal agencies. C. Frick added that NSF is one of the safer forms of funding.

OGS is working on establishing a deeper connection with individual programs from an advising perspective. Meetings were held with department managers last week to establish a better methodology for advising non-thesis master's students and combined (4+1) students. Combined students are those who are undergraduate students in a degree program. Once they reach a certain number of credit hours and a certain GPA is met, they are invited to apply for the combined program which allows them to count two 500-level courses at the UG and GR level. Currently, once a student applies to be a combined student, they are no longer advised by CASA. Instead, they are sent to a department and assigned an advisor. However, department advisors are more used to advising thesis-based students and do not completely understand the unique aspects of non-thesis master's students such as the special forms they require and undergraduate financial aid stipulations. Therefore, OGS is focusing on the advising process for each department to help prepare for registration for next year.

- **Question:** J. Spear asked, is Mines at a point where undergraduate and graduate CASA are needed?
- **Answer:** C. Frick answered that this has not happened because some individual departments are reluctant to hand over advising to CASA. Some departments prefer to have individual faculty advisors. In the future, there may be separate CASA advising for combined or non-thesis students but there is need to fix advising issues now.

Registrar's Office Paul Myskiw

The number of students interested in a combined program has increase significantly (200 to over 900). Mines will be graduating the largest cohort of undergraduate students in a master's program in May. This has generated additional revenue in the extra year since these students are paying the UG tuition rate. Please review the catalog language about reduced registration (under Registration and Tuition Classification). The catalog states that graduate students must pay for 24 credit hours before they are eligible for reduced registration (54 credit hours for PhD students). For the next meeting, the Council can discuss this and recommend any changes.

- **Comment:** J. Briggs added that each department is handling reduced registration qualification in a different way. It might be helpful to discuss the department variations and how it affects graduate students, both master's and PhD students.

Graduate Student Government Ellie Miller

2:20-2:30 pm **Curriculum Item(s) for Council Vote**

1.1 **CEE** Lori Tunstall
[CIM 12/19]
1 course deactivation: **CEEN591: EROSION CONTROL AND LAND RESTORATION**

Professor teaching this course cannot offer this course in person.

This course deactivation is no longer needed. The CEE department would like this course still on the books for possible future offerings in lieu of deactivation.

1.2 **GE** Ryan Venturelli

[CIM 12/4]

1 course change: **GEGN561: UNDERGROUND CONSTRUCTION ENGINEERING LABORATORY**

To conform with changes in the program, appeal to more students and move away from .5 credit offerings. Combining GEGN561 and GEGN562 into one, 1 credit class that meets weekly. The program has changed and so the co-requisites no longer make sense and should be removed. GEGN 562 would then be removed from the catalog.

1 course deactivation: **GEGN562: UNDERGROUND CONSTRUCTION ENGINEERING LABORATORY 2**

GEGN561 and GEGN562 will be combined into a single one-credit hour course so GEGN562 is no longer needed.

MOTION: The motion to approve the GEGN561 course change and GENG562 course deactivation was moved by K. Findley and seconded by A. Kroepsch. The motion to approve the GEGN561 course change and GEGN562 course deactivation was unanimously approved with zero opposition and zero abstentions.

1.3 **EE** Yamuna Phal

[CIM 12/6, 12/17, 1/8]

1 program change: **MSPHD-EE18: MS & PHD IN ELECTRICAL ENGINEERING**

Changing credit hour requirement for PHD from 36 to 30.

4 course deactivations: **EENG508: ADVANCED TOPICS IN PERCEPTION AND COMPUTER VISION**

The course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create opportunities for the development of new EE electives.

EENG31: ACTIVE NONLINEAR RF & MICROWAVE DEVICES

The course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create more opportunities for the development of new EE electives.

EENG571: MODERN ADJUSTABLE SPEED ELECTRIC DRIVES

The course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create more opportunities for the development of new EE electives.

EENG583: ADVANCED ELECTRICAL MACHINE DYNAMICS

The course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create more opportunities for the development of new EE electives.

MOTION: The motion to approve the EE program change and course deactivations was moved by A. Kroepsch and seconded by T. Voelker. The motion to approve the EE program change and course deactivations was unanimously approved with zero opposition and zero abstentions.

1.4 **QBE** Cadi Gillette/John Spear
[CIM 12/17]
1 course change: **BIOL500: CELL BIOLOGY AND BIOCHEMISTRY**

Update contact hours to reflect 1 credit hour practicum instead of a lab.

MOTION: The motion to approve the BIOL500 course change was moved by Y. Phal and seconded by R. Venturelli. The motion to approve the BIOL500 course change was unanimously approved with zero opposition and zero abstentions.

1.5 **GEOCHEMISTRY** Jim Ranville
[CIM 1/8]
2 program change: **CRTG-AG: GRAD CERT IN ANALYTICAL GEOCHEMISTRY**

Updated course list to reflect current course offerings – removed CHGC508 from core courses changing certificate program to 9 credits; removed MNGN556 from elective course list.

MSPHD-GCAS: MS & PHD IN ANALYTICAL GEOCHEMISTRY

Bringing the total course credits needed down (36 to 30) will make the degree more attractive and updating the course list to reflect current offerings which reduces confusion and frustration for students.

MOTION: The motion to approve the GC program changes was moved by T. Voelker and seconded by K. Findley. The motion to approve the GC program changes was unanimously approved with zero opposition and zero abstentions.

1.6 **CHEMISTRY** Bettina Voelker
[CIM 1/8]
1 new course: **CHGN513: CHEMISTRY OF THE LANTHANIDES AND ACTINIDES**

The production of energy with a small carbon footprint is one of the core components of both Mines' teaching and research missions. This course focuses on the chemistry and properties of the elements used in nuclear energy production as well as in many critical materials, e.g. the rare earths, used in almost all modern technologies.

MOTION: The motion to approve CHGN513 was moved by Y. Phal and seconded by R. Venturelli. The motion to approve CHGN513 was unanimously approved with zero opposition and zero abstentions.

1.7 **CS** Mehmet Belviranli
[CIM 1/8]
1 program change: **MSPHD-CS: MS & PHD IN COMPUTER SCIENCE**

Updating core requirements – added CSCI582, CSCI565, and CSCI563 as alternative core courses; updated course requirements for grad cert program.

MOTION: The motion to approve the CS program change was moved by K. Findley and seconded by Y. Phal. The motion to approve the CS program change was unanimously approved with zero opposition and zero abstentions.

2:30-2:40 pm **Continued Business**

2.1 **CEE** Lori Tunstall
[CIM 12/5]
1 course change: **CEEN513: ADVANCED GEOMATERIAL MECHANICS**

Removed GEGN561 as a co-requisite as it is no longer offered.

MOTION: The motion to suspend voting rules for continued business items and vote during the 2/5 GC meeting was moved by L. Tunstall and seconded by J. Shragge. The motion to suspend voting rules for continued business items and vote during the 2/5 GC meeting was unanimously approved with zero opposition and zero abstentions.

MOTION: The motion to approve the CEEN513 course change was moved by A. Kroepsch and seconded by Y. Phal. The motion to approve the CEEN513 course change was approved unanimously with zero opposition and zero abstentions.

2.2 **GP** Jeff Shragge
[CIM 12/4, 12/5]
1 program change: **MSPHD-GPE/GPH: MS & PHD IN GEOPHYSICS & GEOPHYSICAL ENGINEERING**

The listed required "professional development" coursework cannot be completed by Geophysics PhD students as currently listed due to course deactivations or non-offerings. The Geophysics Department Faculty has discussed and approved an expansion and broadening of our definition of professional development to include relevant coursework in EBGN and EDNS, including topics related to entrepreneurialism and the socio-technical nexus. This strategy is consistent with the stated goals and mission of Mines@150.

3 course deactivations: **GPGN551: WAVE PHENOMENA SEMINAR**

This "course" is being removed since it is effectively run as a group s1 andeminar. The Geophysics Departmental Graduate Advisory Committee has developed new guidelines for differentiating between a course and group seminar. The organizers of this course agree that GPGN551 does not conform to these guidelines and would prefer to deactivate it at this point.

GPGN559: RESERVOIR CHARACTERIZATION SEMINAR

This "course" is being removed since it is effectively run as a group seminar. The Geophysics Departmental Graduate Advisory Committee has developed new guidelines for differentiating between a course and group seminar. The organizers of this course agree that GPGN559 does not conform to these

guidelines and would prefer to deactivate it at this point.

GPGN681: GRADUATE SEMINAR – PHD

We are requesting that GPGN681 be removed since the Geophysics Department is consolidating our GPGN581 MSc and GPGN681 PhD seminar into a single GPGN581 graduate seminar course. This will remove redundancy and duplication of reporting across our graduate programs. The requested changes to GPGN581 have already been entered into CIM for GC consideration.

1 course change: **GPGN581: GRADUATE SEMINAR**

Consolidating MS (GPGN581) and PhD (GPGN681) Graduate Seminar courses into a single 500-level course.

MOTION: The motion to approve the GP program change, course deactivation, and GPGN581 course change was moved by R. Venturelli and seconded by A. Kroepsch. The motion to approve the GP program change, course deactivation, and GPGN581 course change was approved unanimously with zero opposition and zero abstentions.

2.3 **ME** Rajavasanth Rajasegar
[CIM 1/24]
14 course deactivations:

DTCN501: INTRODUCTION TO DATA CENTER ENGINEERING
DTCN502: DATA CENTER INFRASTRUCTURE MANAGEMENT
DTCN503: DATA CENTER ENGINEERING GRADUATE SEMINAR
DTCN591: DATA CENTER ENGINEERING AND ANALYSIS
MEGN512: ADVANCED ENGINEERING VIBRATION
MEGN513: KINETIC PHENOMA IN MATERIALS
MEGN520: BOUNDARY ELEMENT METHODS
MEGN521: INTRODUCTION TO DISCRETE ELEMENT METHODS (DEMS)
MEGN531: PROSTHETIC AND IMPLANT ENGINEERING
MEGN537: PROBABILISTIC BIOMECHANICS
MEGN583: ADDITIVE MANUFACTURING
MEGN584: MODELING MATERIALS PROCESSING
MEGN597: CASE STUDY – MATERIALS SCIENCE
MEGN671: RADIATION HEAT TRANSFER

These courses have not been offered in the past 5 years and we do not plan on offering this course anymore.

MOTION: The motion to approve the ME course deactivations was moved by J. Spear and seconded by R. Venturelli. The motion to approve the ME course deactivations was approved unanimously with zero opposition and zero abstentions.

2.4 **EE** Yamuna Phal
[CIM 1/27]
1 course change: **EENG588: POWER SYSTEM ECONOMICS AND ELECTRICITY MARKETS**

EENG588 – Power System Economics and Electricity Markets will be designed to replace the existing

EENG588 – Energy Policy, Restructuring and Deregulation of Electricity Markets course with a shorter and more appealing title, and content modernization. More specifically, the proposed course will combine economic aspects of power systems with the design and operation of electricity markets. It will also integrate theoretical principles with hands on optimization tools that are widely used in the power engineering industry. The proposed course will advance Mines@150 Mission, Vision and Strategic Plans in several ways: The proposed course will significantly contribute to advancing the Mines@150 Mission, Vision, and Strategic Plans in the following ways:
1. Attracting Strategic Talent
As a new and forward-looking online course in an emerging engineering field, it will position Mines as a leader in power sector education. The course is expected to attract more non-thesis master's students from key sectors such as electric utilities, grid operators, national laboratories, and consulting firms, thereby strengthening Mines' appeal to working professionals seeking advanced, practical knowledge.
2. Expanding Research Scale and Impact
This course will foster growth in power engineering research by equipping students with the expertise needed to address real-world challenges in the energy sector. With Colorado utilities anticipated to join the Southwest Power Pool (SPP) market, the course will create opportunities for research funding and collaboration with local organizations. By addressing emerging industry trends, this course aligns with the strategic goals of enhancing Mines' research prominence.
3. Inspiring Innovation and Addressing Industry Challenges
The course will inspire students to tackle critical challenges in the power sector, including decarbonization, grid modernization, and market integration. It will actively promote Mines' core values—collaboration, respect, inspiration, and innovation—by encouraging creative problem-solving and fostering a culture of teamwork and respect for diverse perspectives.

Delivery: Online
The responsible faculty (Josue Campos do Prado) has completed the Foundations of Online Course Design (FOCD) in November of 2024.
Anticipated date for course development completion: Summer 2025.
Anticipated first semester of delivery: Fall 2025 or Spring 2026.

MOTION: The motion to approve the EENG588 course change was moved by R. Venturelli and seconded by J. Shragge. The motion to approve the EENG588 course change was approved unanimously with zero opposition and zero abstentions.

2:40-2:50 pm **New Business**

3.1	**CS**	Mehmet Belviranli/Wendy Fisher/Zibo Wang/Dong Chen
	[CIM 1/28; 1/29; Provost 1/29]	
	4 new courses:	**CSCI520: SOFTWARE ENGINEERING SYSTEMS DEVELOPMENT I**

This is one of a two-semester sequence of courses that will be the unique cornerstone for the Advanced Software Technologies Track of the CS OL Professional Master's Program and not intended for on-ground deployment. The track in Advanced Software Technologies is targeted to train recent graduates or mid-career professionals with a bachelor's degree in computer science or other STEM-related field with acquired basic knowledge in programming, data structures, and software engineering.

CSCI 520:
All the course content will be organized into Modules. Inside the modules you will find assignments, discussions, and quizzes to go along with lecture slides.
Module 1: Introduction to Systems Development
Module 2: Introduction to Project Management
Module 3: Systems Definition
Module 4: Systems Specifications
Module 5: Component Analysis and Selection
Module 6: System Modeling
Module 7: Proof-of-Concept Development

CSCI 521
Module 8: System Integration
Module 9: System Testing
Module 10: System Evaluation
Module 11: System Deployment
Module 12: System Extensibility

Note: We have received approval from Iris, Dean Berger, and Carl Frick. We have submitted a request to Jon in the Online Center for approval of the 2025 Development. Thus, we need a permanent number to be able to create an online course.

CSCI521: SOFTWARE ENGINEERING SYSTEMS DEVELOPMENT II

This is the second of a two-semester sequence of courses that will be the unique cornerstone for the Advanced Software Technologies Track of the CS OL Professional Master's Program and not intended for on-ground deployment. The track in Advanced Software Technologies is targeted to train recent graduates or mid-career professionals with a bachelor's degree in computer science or other STEM-related field with acquired basic knowledge in programming, data structures, and software engineering.

This set of courses is being designed exclusively for online delivery (will not be offered residentially). The courses are very hands-on with real world applications for recent graduates and mid-career professionals with a STEM background. The courses are being collaboratively created between CS and EDS. These courses have received approval from the CS graduate committee, the CS department head, the portfolio dean, the graduate dean, and Mines Online.

CSCI576: DEEP LEARNING

This course is offered both in-person and online
FOCD completed in July 2022
Complete the development in Aug 25
First delivery in Spring 2026
Open for registration in Fall 25

This course is a split from the current Introduction to Machine Learning class. The motivation behind creating this course is because the field of machine learning has been changing so fast. The course will be offered in person and online for undergraduate and graduate students. It will be cross-listed with

DSCI. The course will be very hands-on with project-based learning. Students will have three major case study projects and programming with Python and TensorFlow. There is effort to minimize to overlap with other courses such as Internet Machine Learning and Advanced Data Science.
Question: J. Spear asked, could additional information about the course be added to the justification section in CIM to provide more detail about this course?
Answer: Z. Wang answered that additional information will be provided with a detailed plan and learning outcomes.
Question: J. Shragge asked, is there any potential impact on Mines HPC resources?
Answer: Z. Wang answered that there is no plan to utilize any HPC. Most projects can be done locally on a personal computer or a free online Cloud resource like Google Colab.

CSCI583: IOT SECURITY AND PRIVACY

The use of IoT (Internet-of-Things) devices in U.S. homes is becoming increasingly popular. These smart devices, however, come with a range of new security and privacy risks that must be addressed, particularly in light of emerging AI techniques. AI-powered attacks and their prevention are significant gaps in this area. This course focuses on teaching both foundational and advanced concepts of IoT security and privacy from a data-driven perspective. This course stands apart from other offerings by covering topics such as networking and Internet security while integrating security research through data analysis. Students will read and present academic papers spanning multiple disciplines and perspectives, including computer science, psychology, policy, and law. The course also features hands-on projects where students independently investigate real-world security and privacy challenges of IoT devices and systems, proposing practical solutions to address them. While CSCI585 and CSCI587 introduce general principles of information security and privacy, this proposed course delves into the core of security and privacy within the largest domain—IoT. It uniquely combines insights into vulnerabilities with prevention strategies using the latest AI techniques, equipping students with cutting-edge knowledge to tackle modern challenges.

The future of engineering and technology will be driven by AI@Edge, TinyML, and advancements in security and privacy. Safeguarding the security of IoT devices and systems is, and will remain, one of the key challenges that the industry must address. Introducing a course in our curriculum that focuses on teaching state-of-the-art practices to prepare students for this challenge aligns with Mines' broader strategic goal of being "a top-of-mind and first-choice university" by "expanding offerings and diversifying delivery." This course will equip students with the skills needed to tackle critical industry demands while reinforcing Mines' leadership in innovative education.

This course has been taught as a special topics course twice and is seeking a permanent course number.

1 course change: **CSCI578: BIOINFORMATICS**

This course will be offered to graduate students in CS (both graduate and combined programs) and cross-listed with BIOL510 it will be offered to Quantitative Biosciences and Engineering students. With both in-person and online modality versions, it will be accessible to a large number of students who are interested in practical applications of algorithms and machine learning to life sciences. Updated course description and added CSCI128 and CSCI220 as prerequisites. Added summer semester to be offered.

The changes requested include adding online modality, adding two prerequisites (CSCI128 and CSCI220), adding another semester offering in the summer, and updating the course description as there were some outdated activities listed.

- **Question:** K. Findley asked, why are there two undergraduate courses listed as prerequisites? J. Spear asked, if a graduate student comes into this program that is not a Mines undergraduate alum, how do students fulfill these prerequisites?
- **Answer:** W. Fisher answered that CSCI128 is a core course requirement and CSCI220 is a required course for all CS master's students. M. Belviranli added that this will be reviewed again.

3.2 **GE** Ryan Venturelli
[CIM 1/30]
1 course change: **GEOL515: ADVANCED MINERAL DEPOSITS**

This request reduces the number of credits for this course and slightly updates the course description. The course has not been taught for years but will be revived at lower credits in Fall 2025.

This course used to be 3 credit hours but is being changed to 2 credit hours to encourage more enrollment (20 students) and offer it more regularly.

3.3 **ME** Angel Abbud Madrid
[CIM 1/30; Provost 2/3]
1 new course: **SPRS509: SPACE ROBOTICS**

The Space Resources online graduate program is the first one in the world educating scientists, engineers, economists, entrepreneurs, and policy makers in the field of space resources. This one-of-a-kind, innovative, multidisciplinary program aims to take the 150-year-old, world-renowned expertise at Mines in resource exploration, extraction, production, and utilization to its next frontier by identifying, extracting, and using resources beyond Earth. This online course equips students with the foundational knowledge and skills to design, analyze, and operate robotic spaceflight missions, focusing on the intersection of space exploration and robotics. By exploring scientific questions about planetary bodies and the technologies enabling robotic missions, students will define and develop a new mission, identifying critical data signals, sensors, operations, and actuators. They will evaluate automation trade-offs, understand rover mobility, and synthesize robotic capabilities into measurable outcomes. This course prepares students for frontier careers in aerospace and robotics, equipping them with the technical, analytical, and organizational skills needed to tackle complex challenges in the field.
Provide detail about how the course will be delivered: Online.
If online is listed:
- Cite the date the responsible faculty has completed or will complete the Foundations of Online Course Design (FOCD): The instructor completed the FOCD on 09/24/2024
- Anticipated date for course development completion: June 30, 2025
- Anticipated first semester of delivery: Fall 2025

3:00 pm **Adjourn** John Spear

Next meeting:
February 5, 2:00-3:00 pm GC224/Zoom. Please send all agenda items to John Spear (jspear@mines.edu) or Kristeen Serracino (kristeen.serracino@mines.edu) 1 week in advance.

Consent Agenda The following proposals will not be discussed unless specifically requested by the Council. Please review the following items. With no objections, approval is implied, and items will be processed accordingly.

4.1 **Approval of Previous Minutes** – January 29, 2025 John Spear

4.2 **ME** Rajavasanth Rajasegar

[CIM 1/29; Provost 1/29]

2 new courses:

MEGN523: APPLIED COMPUTATIONAL FLUID DYNAMICS

Computational Fluid Dynamics, and especially ANSYS Fluent, is the go-to tool for several large industry sectors, such as Aerospace, Energy and chemical processing. For our students, having experience with such job-ready tools is critical for them to get a leg up over their competition.

The course is already listed as an MEGN423 and students will be given the opportunity to apply these same benefits to a graduate-level course offering.

MEGN527: VEHICLE DYNAMICS & POWERTRAIN SYSTEMS

A class on Vehicle Dynamics and Powertrain Systems aligns with the vision outlined in the Mines@150 strategic plan for Colorado School of Mines in several ways:

Expanding Offerings and Diversifying Delivery: Offering a class on vehicle dynamics and powertrain systems demonstrates the university's commitment to expanding its educational offerings in response to the changing needs of industry and society. Students expand upon the knowledge gained in MEGN 391 automotive systems, with a focus on developing practical mastery of the dynamics and mechanics of vehicle propulsion. MEGN 417/527 then serves as a launching pad for students to take advanced courses in a variety of powertrains, whether they be internal combustion engines (MEGN 466), electric powertrains (MEGN 465/565), or fuel cells (MEGN 469/569).

Strengthening Affinity for Mines: A practical, hands-on class on vehicle dynamics and powertrain systems is a unique opportunity at Mines for hands on engineering experience. Students will start in the classroom, spend time expanding their knowledge in an automotive simulator, and close out the course with practical vehicle testing at a small scale. The courses in the automotive elective track attract students and alumni from across the country as there is a limited automotive engineering presence in the Rocky Mountain region.

Being Innovative and Entrepreneurial: Students are challenged to design and optimize a competitive vehicle as part of their course project. Looking through the lens of a real-world challenge (racing), teams must consider factors such as their operating budget, safety, feasibility, and design tradeoffs when trying to optimize the overall automotive system.

The course is already listed as an MEGN 417 and students will be given the opportunity to apply these same benefits to a graduate-level course offering.