Colorado School of Mines – UNDERGRADUATE COUNCIL MEETING MINUTES
January 22, 4:00 – 5:00 pm, via Zoom

Attendees:

Voting Members: 19 total (10 needed for quorum). Quorum was present.

P	Ventzi Karaivanov (chair)	P	Erik Menke (CH)	P	Adam Olsen (LB)	P	Heather Lammers for Rennie Kaunda (MN)
P	Jason Ganley (CBE)	P	Jeremy Suiter (EB)		Emmanuel De Moor (MME)	P	Mathias Burisch Hassel (GE)
P	Rob Thompson (CS)	P	Ge Jin (GP)	P	Jeff Wheeler (ME)	P	Eliza Buhrer (HASS)
P	Linda Battalora (PE)	P	Hongyan Liu (CEE)	P	Hisham Sager (EE)		Tom Powell (USG)
P	Jack Bringardner (EDS)	P	Gus Greivel (AMS)	P	Chip Durfee (PH)		

Other Regular Attendees and Guests

	Sam Spiegel (Mines Online)		Vibhuti Dave (UGS)	P	Kristeen Serracino (AA)		Paul Myskiw (RO)
	Karla Pérez-Vélez (CASA)		Danielle Boileau (CASA)		Cheryl Medford (GE)	P	D. Scott Heath (RO)
	Katie Ludwin (CASA)		Megan Sanders (Trefny Center)		Colin Terry (SL)		
	Luke Contreras (UA)		Julia Cable (UA)				

Special Guest(s): Christian Beren, Kristoph Kinzli, Chelsea Salinas, Brandon Dugan, Bill Zisch, Lakshmi Krishna

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Welcome Ventzi Karaivanov

As a continuation of discussion from the Fall, V. Karaivanov proposed that the Undergraduate Council transition to in-person/hybrid meetings starting next semester. Currently, both Faculty Senate and Graduate Council meet in person with an option to participate via Zoom. Please let V. Karaivanov know of any suggestions/concerns.

B. Dugan, Faculty Senate President, added that one of the UGC agenda items included a course prefix request. It was to Faculty Senate's attention because there are currently no policies in place on how to determine if and how courses/programs get course prefixes.

Approval of Minutes –*January 8, 2024* Ventzi Karaivanov

MOTION: The motion to approve the previous meeting minutes was moved J. Ganley and seconded by H. Sager. The motion to approve the previous meeting minutes was approved with 14 approved, 0 opposed, and 3 abstentions.

Briefings and Information Items

Registrar's Office D. Scott Heath for Paul Myskiw

Today is Census Day. The add/drop deadline was moved to the Wednesday after the 1st day of classes. The Registrar's Office is working to update and finalize enrollment data.

- **Comment:** G. Greivel added that there have been a few math core course students making late changes before the add/drop day. The Trailhead course is up-to-date but is not pushing students to the correct Canvas course.
- **Comment:** D. Scott Heath added that the Registrar's Office does not control how students are pushed in Canvas. The process does not refresh instantly to Canvas so it may be updating at a

slow frequency. If there are issues, there is a new Canvas Tech Support page: https://online.mines.edu/tech-support/.

Undergraduate Studies Vibhuti Dave

1 Curriculum Item(s) for Council Vote

***Please complete Canvas voting for the following curriculum item(s) by January 22nd at 3:00 pm.**

1.1

CEE		Hongyan Liu
CIM 12/4		
3 program change:	BS-CE: BS IN CIVIL ENGINEERING	
	The changes are made based on recent CEE faculty vote of reduce credit plan for Civil. Remove GEGN101, MEGN315 and 1 free elective; Add CE version of Engineering Dynamics (CEEN317).	
	BS-CONSTR: BS IN CONSTRUCTION ENGINEERING	
	Changes are made based on recent CEE faculty vote of reduce credit plan for Construction. Add CEEN315, Remove CHGN122, PHGN200, GEGN101; Make CHGN122/PHGN200/GEGN101, CBEN101 as option for students to choose +4 Material/Env track, add CHGN122 Underground track, add GEGN101 Robotics track, add PHGN200.	
	BS-EVE: BS IN ENVIRONMENTAL ENGINEERING	
	The changes are made based on current CEE faculty vote of reduce credit plan for ENV. Remove PHGN200.	

Canvas Voting Results (BS-CE, BS-CONSTR, BS-EVE)
14 approved, 0 opposition, 0 abstentions, 0 additional discussion needed

2 Continued Business

2.1

EE		Hisham Sager
CIM 12/6		
1 program change:	BS-EE: BS IN ELECTRICAL ENGINEERING	
	1) Updated language, 2) Added EENG484 as a new EE elective: this course was recently approved as a new course, based on the special topics course were previously allowed to count as an EE elective (EENG498: Adv. Embedded Systems), 3) Added MEGN465 as a new EE elective: When this was a special topics course last year, we approved it as an EE elective by way of course exceptions. Since the contents and learning objectives have remained the same with the new course code, we would like to officially make this an approved EE elective, and 4) Moved EBGN321 from the sophomore year to junior year, which required swapping EBNG321 with MATH332 on the flowchart.	
5 course deactivations:	EENG390: ENERGY, ELECTRICITY, RENEWAL ENERGY, AND ELECTRIC POWER GRID	

	Course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create opportunity for development of new EE electives.
	EENG413: ANALOG AND DIGITAL COMMUNICATION SYSTEMS
	Course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create opportunity for development of new EE electives.
	EENG481: ANALYSIS AND DESIGN OF ADVANCED ENERGY SYSTEMS
	Course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create opportunity for development of new EE electives.
	EENG486: ELECTROMAGNETIC FIELDS AND WAVES
	Course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create opportunity for development of new EE electives.
	EENG489: COMPUTATIONAL METHODS IN ENERGY SYSTEMS AND POWER ELECTRONICS
	Course has not been offered in several years and there are no plans to offer this course again. Deactivating this course will create opportunity for development of new EE electives.
1 course change:	EENG393: FE ON INTEGRATED CIRCUITS AND ELECTRONICS PRACTICUM
	Update course delivery to include online.
1 new course:	EENG424: ELECTROMAGNETIC FIELDS AND WAVES
	We are updating the course number for EM FIELDS & WAVES to more accurately reflect the correct sequence of the AWC courses. The course code used to be EENG486. To make this number change, we deactivated the old course (as advised by Kristeen Serracino) and proposed a new course with this new number. This new course number also allows for the course to match a cross-listed GR course (EENG524); the EE dept is currently working on developing a proposal for that new GR course.

2.2

CS		Rob Thompson
CIM 12/9		
1 course change:	DSCI403: INTRODUCTION TO DATA SCIENCE	
	Replaced prerequisites with CSCI128 with a grade of C- or higher, MATH201 or MATH334	
CIM 12/30		
1 program change:	BS-CS: BS IN COMPUTER SCIENCE	

	Replaced HASS200 Global Studies with HASS215 FUTURES Moved the CS Elective and Free Elective present in every track to part of the CS Core for simplicity when viewing track requirements. CS General: Grouped into more accurate categories CS + Business: Replaced CSCI303 with CSCI413, updated list of eligible EBGN courses and grouped into more accurate categories CS + Computer Engineering: updated list of eligible EENG courses and grouped into more accurate categories CS + Data Science: Replaced CSCI303 with CSCI413, updated list of eligible MATH courses and grouped into more accurate categories CS + Entrepreneurship & Innovation: new proposed track to align with university E&I initiatives CS + Research Honors: discontinuing, to be replaced with university-wide "+ Honors" distinction when approved CS + Robotics & Intelligent Systems: updated list of eligible EENG/MEGN courses and grouped into more accurate categories CS + Space: updated list of eligible EENG/MEGN courses and grouped into more accurate categories

2.3

EB		Jeremy Suiter
CIM 12/16		
1 program deactivation:	BS-ECO: BS IN ECONOMICS	
	Program deactivation.	
7 course deactivations:	EBGN230: INTRODUCTION TO BUSINESS	
	The topics of this course are covered in EBGN360, Introduction to Entrepreneurship. The department is now offering a broad range of introductory level business courses focused on topical areas (entrepreneurship, management, marketing, communication, accounting).	
	EBGN306: MANAGERIAL ACCOUNTING	
	Changed the title and learning outcomes of EBGN305 in a previous catalog to Survey of Accounting. EBGN305 now has topics from both Financial and Managerial Accounting and separate classes are not necessary.	
	EBGN401: ADVANCED TOPICS IN ECONOMICS	
	This class has not been offered in many years.	
	EBGN409: MATHEMATICAL ECONOMICS	
	This class is not required at the undergraduate level anymore, and anyone who is interested should take the 500-level version. Not needed for Economics or BEMS programs.	
	EBGN425: BUSINESS ANALYTICS	

	This course has been replaced in the curriculum by EBGN280, Introduction to Business Analytics.
	EBGN444: INNOV8X
	This class is now taught with the INNO course prefix outside of the EB department.
	EBGN496: PAYNE SCHOLARS PROGRAM
	This course is not well subscribed and is alternately available with the HNRS prefix.

2.4

QBE		Christian Beren
CIM 12/16		
1 program change:	BS-IBIO: BS IN QUANTITATIVE BIOSCIENCES AND ENGINEERING	
	The addition of the Honors track will provide QBE students with the opportunity to further their education and attain a higher degree of recognition in the process. We are expanding the entrepreneurship by taking it from 1 to 3 credit hours and encouraging students to undertake Senior Design projects as a means of honing their practical skills.	

2.5

EDS		Chelsea Salinas/ Jack Bringardner
CIM 12/17		
1 program change:	BS-DSGN: BS IN DESIGN ENGINEERING	
	After Advisory Board and ABET reviews of the Design Engineering program, along with a request from the Dean to review our credit hour requirement, our undergraduate committee approved to update the Design Engineering program curriculum - reducing our credit hours to 126. We aimed to retain ABET required math/science and technical engineering content while expanding our upper-level Design Engineering elective structure, as recommended by our various constituents (advisory board, students, faculty, alumni). We also put forth in this proposal the removal of the Focus Area identification and transcription. The majority of our students choose the Individualized Focus Area currently. With this data confirming the projection of our students into the workplace, recommendations by our constituents and creation of a more streamlined assessment process for ABET, our undergraduate committee and departmental faculty approve the removal of defined Focus Areas. In lieu of the Focus Areas, we have proposed reallocation of the various elective courses taken to fulfill breadth and depth. We now propose three categories for Design Engineering	

	Electives, Engineering Electives and Thematic Electives (advisor approved). Our undergraduate committee believes the new elective structure will maintain the degree flexibility sought through the Design Engineering program while providing organization and structure with a stronger focus on program coursework. We have updated course codes and titles of our Integrative Design Studio courses in an effort to align more closely with other disciplines on campus as they have outlined their programming structure.
2 course deactivations:	EDNS191: INTRODUCTION TO INTEGRATIVE DESIGN
	The Design Engineering undergraduate program committee has recently proposed a restructuring of the program curricula and has determined it best for students to follow the core curriculum as closely as possible. ENDS 191 and EDNS 192 would be redundant courses for EDNS 151 and HASS 100, therefore, we recommend deactivating EDNS 191 and 192 to avoid confusion for students and to align better with the course curriculum.
	EDNS192: DESIGN AND HUMAN VALUES
	The Design Engineering undergraduate program committee has recently proposed a restructuring of the program curricula and has determined it best for students to follow the core curriculum as closely as possible. ENDS 191 and EDNS 192 would be redundant courses for EDNS 151 and HASS 100, therefore, we recommend deactivating EDNS 191 and 192 to avoid confusion for students and to align better with the course curriculum.
2 new courses:	EDNS445: PRODUCT REDESIGN
	After Advisory Board and ABET reviews of the Design Engineering program, our undergraduate committee sought to incorporate upper-level Design Engineering courses into the program to provide breadth and depth in the field of study for majors and non-majors wanting to explore design theory, methods and practice. Based upon research in the field, advisory board recommendations and student feedback, our undergraduate committee determined two areas of advanced studies in design practice. This proposed class will feature applications of new software, innovative exploration in building and impactful team-based projects. The proposed class will be a required upper-level design elective under program updates targeting the Fall 2025 catalog.
	EDNS450: INCLUSIVE DESIGN FOR THE BUILT ENVIRONMENT
	After Advisory Board and ABET reviews of the Design Engineering program, our undergraduate committee sought to incorporate upper-level Design Engineering courses into the program to provide breadth and depth in the field of study for majors and non-majors wanting to explore design theory, methods and practice. Based upon research in the field, advisory board recommendations and student feedback, our undergraduate committee determined two areas of advanced studies in design practice. This proposed class will feature applications of new

	software, innovative exploration in building and impactful team-based projects. The proposed class will be a required upper-level design elective under program updates targeting the Fall 2025 catalog.
6 course changes:	EDNS200: INTRODUCTION TO DESIGN ENGINEERING
	After Advisory Board and ABET reviews of the Design Engineering program, our undergraduate committee sought to update course catalog listings to streamline course sequencing, removing HASS200 as co-requisite.
	EDNS210: PHYSICAL PROTOTYPING
	After Advisory Board and ABET reviews of the Design Engineering program, our undergraduate committee sought to update course catalog listings to streamline course sequencing, add HASS100 & EDNS151 or HRNS115 or HNRS1200 as a prerequisite; adding EDNS200 and PHGN200 as a co-requisite.
	EDNS220: PROBLEM FRAMING & STAKEHOLDER ENGAGEMENT
	After Advisory Board and ABET reviews of the Design Engineering program, our undergraduate committee sought to update course catalog listings to streamline course sequencing, removing EDNS291 and adding EDNS210 as a pre-requisite.
	EDNS310: SYSTEMS MODELING & DESIGN
	After Advisory Board and ABET reviews of the Design Engineering program, our undergraduate committee sought to update course catalog listings to streamline course sequencing, removing EDNS292 and adding EDNS200 as a pre-requisite; adding MATH225 as a co-requisite.
	EDNS320: ENGINEERING JUDGMENT
	After Advisory Board and ABET reviews of the Design Engineering program, our undergraduate committee sought to update course catalog listings to streamline course sequencing, removing EDNS391 and adding EDNS310 as a prerequisite.

2.6

GE		Mathias Burisch Hassel
CIM 12/19		
1 program change:	BS-GLE: BS IN GEOLOGICAL ENGINEERING	
	Modifications to the tracks within our degree will better match the industries where our students are employed, the graduate programs they enter, and the long-term trends in geoscience and geological engineering education. Moreover, the modifications include removal of GEGN 204 in order to address the university-level directive to reduce overall course hours in our curriculum. Based on an analysis of our	

	program learning objectives, coupled with a review of the syllabi for each of our sophomore-level courses, we have decided that the critical course content in GEGN 204 can be adequately addressed in other classes, and we can remove that course from our curriculum.

2.7

CEE		Hongyan Liu
CIM 12/19		
1 course deactivation:	CEEN491: EROSION CONTROL AND LAND RESTORATION	
	The professor teaching this course cannot offer this course in person and online modality offering was denied by the dean.	

2.8

CBE		Jason Ganley
CIM 12/19		
1 program change:	BS-CHE: BS IN CHEMICAL ENGINEERING	
	CBEN424 isn't listed as an approved elective for the CBE Process Track (which it should be). Also, moving Combined BS/MS language to end of program desc.	

2.9

ME		Jeff Wheeler Kristoph Kinzli
CIM 1/3		
2 new courses:	CAPD491: CAPSTONE DESIGN I	
	A non-departmental capstone prefix reflects the multidisciplinary nature of this capstone program and the participation of all engineering departments in the course.	
	CAPD492: CAPSTONE DESIGN II	
	A non-departmental capstone prefix reflects the multidisciplinary nature of this capstone program and the participation of all engineering departments in the course.	

To get more support for the prefix change, two letters of support from the deans who encompass the five programs that make up senior design have been provided. There is also support from all five departments. The cross-listing option will probably not work in this instance as several departments such as CEE already have existing courses with the 491/492 course number. EDS has already included the prefix change in their degree plan and CEE is doing the same.

- **Question:** R. Thompson asked, are there any plans to add additional courses under this prefix?
- **Answer:** K. Kinzli answered that as of now, it would only be the two courses under this prefix with no plan to add additional courses. Depending on resource allocation in the future, these courses would instead fall under more programs which would increase student enrollment.

4:45-5:00 pm

3 New Business

3.1

MN		Heather Lammers/ Rennie Kaunda
CIM 1/6; Provost 1/6		
3 new courses:	MNGN209: DATA ANALYTICS FOR MINING ENGINEERS	
	The mining industry has adopted various technologies requiring systematic data collection and analysis. Every mining phase in the mine life cycle, from exploration to closure, relies on data collection analysis to improve efficiency, reduce costs, enhance safety, and minimize environmental impact. As the industry adopts more automated and digital technologies, the ability to analyze and interpret vast amounts of data becomes crucial. Mining engineers must be proficient in traditional engineering skills and in managing and analyzing data to make informed decisions that align with business objectives and regulatory standards.	
	MNGN320: MINING AND SUSTAINABILITY	
	The course is residential. It is prepared and was piloted in Fall semester 2024 as a special topics course (398). It will be a required course in our mining engineering undergraduate curriculum and will differentiate our program from others globally, as there are no others that have a required sustainability course. When the course was piloted, it had students from Mining Engineering, as well as Civil and Environmental Engineering, Geology, and Petroleum Engineering. In addition, it will provide an opportunity for undergraduate students in other departments to learn about key sustainability issues related to the extractive industries. The course will be offered again in Fall 2025.	
	MNGN412: MINE WATER, WASTE AND CLOSURE	
	Mine water, waste, and closure are important aspects to consider for responsible mining. In addition to the ore deposit, water is essential to a mining project. Water supply must be balanced among local and regional water users and managed as a sustainable resource. Large quantities of waste rock, tailings, spent ore residues, and other types of waste are generated during mining and processing, and must be managed or stored in dedicated facilities. These facilities have the potential to adversely impact surface water and groundwater resources, ecological environments and surrounding communities. Mine closure is perhaps the most significant action a mining operation can perform to limit its long-term negative impact on the environment and provide a long-term beneficial end use after mining operations cease. This course will address fundamentals and future trends related to water, tailings and mine waste, and mine closure, with significant emphasis on environmental, social, technical, and economic risk management.	
3 course changes:	MNGN433: MINE SYSTEM ANALYSIS	
	1 credit hour reduction to make room for another course in MN curriculum. Updated course title.	
	MNGN438: GEOSTATISTICS	

	Curriculum revision - updated contact hours, added MNGN209, MNGN312 and MNGN316 as prereqs; removed MATH112 prereq.
	MNGN482: RISK AND PROJECT MANAGEMENT
	This course is revised to improve students' understanding of risk associated with mining projects and project management as part of the overall required mining engineering undergraduate curriculum offerings by updating course description.

The Mining department recently completed a five-year effort to review the undergraduate curriculum which included a relevancy and content study on all existing courses. Input from the MN industry advisory council, internal and external stakeholders, and recent graduates were also solicited for additional recommendations. As a result, MN is proposing three new course additions. MNGN209 is a 2-credit hour offering that would introduce concepts of data management and analytics earlier in the academic sequence (sophomore year) to better prepare students for the design series in the junior/senior year. MGNG320 would introduce concepts of new and emerging sustainable mining practices. MNGN412 would complement the design series and focus on critical topics in mining. To make some additional room, three course changes were also proposed. MNGN433 and MNGN438 would be reduced by 1 credit hour and MNGN482 would increase by 1 credit hour.

3.2

CS		Rob Thompson
CIM 1/8		
2 course change:	CSCI403: DATA BASE MANAGEMENT	
	Removing historical prereq of CSCI262 (which no longer exists) and listing strictly CSCI200.	
	CSCI431: COMPUTER ORGANIZATION	
	Correcting prereqs – remove CSCI200 and CSCI261	

These course changes are updating the listed prerequisites as they were previously listed under their old course numbers.

3.3

CH		Erik Menke
CIM 1/9; Provost 1/9		
1 new course:	CHGN413: 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. The course will meet with a graduate version, CHGN 513, which will be proposed in graduate council parallel to this proposal.	

This course has been taught as a special topics course and is seeking a permanent course number. This is a unique course offering as very few chemistry programs offer courses like this across the country. It will be cross-listed with a graduate version (CHGN513).

- **Question:** C. Durfee asked, is the application to laser materials a part of the course?
- **Answer:** E. Menke answered yes, there are topics in the syllabus that include europium doping.

3.4

CBE		Jason Ganley
CIM 1/10		
4 course changes:	CBEN320: CELL BIOLOGY AND PHYSIOLOGY	
	Course instructors have found that a basic background of organic chemistry is necessary to effectively deliver all course learning objectives to the students in Cell Biology and Physiology – added CHGN221 as a prerequisite.	
	CBEN321: GENETICS	
	The faculty teaching these courses and believe the "Intro to..." should be dropped in the following courses: CBEN 311, CBEN 321, and CBEN 412. The current course names led to our students' transcripts having way too many "Intro to..." In addition, as there are no "Advanced" versions of these courses, they should stand alone with their direct topical name. Prerequisite addition of Organic Chemistry I, CHGN221. Course instructors have found that a basic background of organic chemistry is necessary to effectively deliver all course learning objectives to the students in Genetics.	
	CBEN311: NEUROSCIENCE	
	The faculty teaching these courses and believe the "Intro to..." should be dropped in the following courses: CBEN 311, CBEN 321, and CBEN 412. The current course names led to our students' transcripts having way too many "Intro to..." In addition, as there are no "Advanced" versions of these courses, they should stand alone with their direct topical name.	
	CBEN412: PHARMACOLOGY	
	The faculty teaching these courses and believe the "Intro to..." should be dropped in the following courses: CBEN 311, CBEN 321, and CBEN 412. The current course names led to our students' transcripts having way too many "Intro to..." In addition, as there are no "Advanced" versions of these courses, they should stand alone with their direct topical name.	

The courses change includes adding CHGN221, Organic Chemistry I, to CBEN320 and removing the "Intro to" to CBEN311, CBEN321, and CBEN412 as graduates had too many "Intro to" courses in their transcripts and there are no advanced versions of these courses.

3.5

GE		Mathias Burisch Hassel
CIM 1/13		
1 course deactivation:	GEGN204: GEOLOGICAL PRINCIPLES AND PROCESSES	

	Based on an analysis of our program learning objectives, coupled with a review of the syllabi for each of our sophomore-level courses, we have decided that the critical course content in GEGN 204 can be adequately addressed in other classes and we can remove that course from our curriculum. Furthermore, this addresses a university-level directive to reduce overall course hours in our curriculum.

This is a course deactivation to address the university-level directive to reduce overall credit hours and to remove redundancy/overlap.

- **Comment:** V. Karaivanov added that this change needs to be included as a program change since it was a required course. There will need to be additional discussion if this can be included in the Fall 2025 catalog as the program change deadline has passed.
- **Comment:** E. Menke added that this course is also a prerequisite for some other courses as well.
- **Comment:** D. Scott Heath added that since the course is a required course in the current catalog, it should be taught out or an alternative would need to be offered.

3.6

QBE		Christian Beren
CIM 1/14; Provost 1/14		
4 new courses:	BIOL410: ENTREPRENEURSHIP IN THE BIOLOGICAL SCIENCES SEMINAR	
	We are now offering a 3-credit version of bio-entrepreneurship. These changes will align the 1-credit seminar version with the newly offered 3-credit version. The 3-credit course builds on the current 1-credit version, offering students an expanded opportunity to explore the biosciences, a field rich with discovery and innovation. It encourages students to deepen their understanding and curiosity, fostering an environment for exploration and learning within this dynamic discipline.	
	BIOL412: ENTREPRENEURSHIP IN THE BIOLOGICAL SCIENCES	
	This course builds on the current 1-credit version, offering students an expanded opportunity to explore the biosciences, a field rich with discovery and innovation. It encourages students to deepen their understanding and curiosity, fostering an environment for exploration and learning within this dynamic discipline.	
	BIOL490: QUANTITATIVE BIOSCIENCES & ENGINEERING UNDERGRADUATE SEMINAR	
	QBE is offering a new undergraduate honors track, which will require undergraduate students to perform research and to attend research seminars for increased exposure to diverse areas of ongoing research. This course offering will allow QBE students to earn credit by attending seminars given by QBE professionals, develop an enhanced understanding of the breadth of quantitative bioscience disciplines, and present their research projects.	

	BIOL491: QBE CAPSTONE DESIGN
	QBE Capstone Design will expand options for open-ended, client-centered design projects at Mines. As a cross-listed course, this will be available for QBE undergraduate students in their final year and QBE graduate students. This supports the Mines@150 mission to expand offerings for professionally oriented pre- and post-graduate education. Scientific inquiry and collaboration with external clients through this design course will grow the scale and impact of research in biosciences at Mines while diversifying potential funding sources. External clients engaged through this Capstone Design experience will form the basis of private investment in future Mines endeavors. The research conducted through QBE Capstone Design will be team-oriented, advancing Mines@150 values of developing a more social research culture.
2 course changes:	BIOL300: QUANTITATIVE BIOLOGY I
	Remove "Introduction to" from the course title since there is no advanced version of this course.
	BIOL301: QUANTITIVE BIOLOGY II
	Remove "Introduction to" from the course title since there is no advanced version of this course.

The four new courses were submitted to align with the program changes that were reviewed earlier in the agenda. The course changes are removing "Introduction to" since there is no advanced version of these courses.

- **Question:** H. Liu asked, what is the difference between the QBE capstone design course and senior design?
- **Answer:** C. Beren answered that the QBE capstone design course has been piloted in conjunction with senior design. However, this course is more bio-focused with visits from people from Anschutz and other biotech companies.
- **Question:** E. Menke asked, procedurally, how long must a course be offered for students who are still on a specific catalog year?
- **Answer:** C. Beren answered that QBE will have BIOL412 meet Monday, Wednesday, Friday for 3 credits and BIOL410 will meet on Wednesday for 1 credit. Big picture items will be covered on Wednesday and more applications and studio-focused topics will be covered on Mondays and Fridays.
- **Comment:** J. Wheeler added that in ME, an alternative class was offered to replace the course that was no longer offered, ensuring that there were equivalent learning objectives being covered.
- **Comment:** C. Beren added that QBE will keep offering BIOL410 until those students graduate.
- **Comment:** D. Scott Heath added that you can also give students the option to change to the newer catalog to take advantage of the lower credits.

3.7

CEE		Hongyan Liu
CIM 1/14; Provost 1/14		
1 new course:	CEEN361: CONSTRUCTION METHODS	
	The proposed construction methods course directly supports the	

	Colorado School of Mines' mission, vision, and strategic plans by providing students with a deep understanding of the essential construction techniques and their impacts on project success. As Mines continues to advance its commitment to producing highly skilled engineers who can tackle global challenges, this course emphasizes practical, hands-on problem-solving skills essential to real-world construction projects. The construction methods course equips students with critical knowledge of how various construction methods—such as earthwork, excavation, and material handling—interact with the properties of materials and affect the overall design, safety, cost, and durability of the construction projects. In addition, this course will specifically prepare students to navigate the complexities of construction logistics, ensuring that they can make informed decisions that align with both engineering principles and real-world constraints. Understanding the relationship between materials and methods is crucial to ensuring the stability, safety, and efficiency of construction projects. The course content will include industry standards, codes, and regulations, emphasizing Mines' focus on quality assurance, safety, and ethical responsibility in engineering practices. At last, the inclusion of construction industry engagement allows students to learn from professionals, providing them with the insights to make sound, practical decisions as they advance in their careers. The course supports Mines' strategic objectives of fostering interdisciplinary knowledge and encouraging collaboration across fields. The construction methods course will not only ensure Mines graduates possess a solid foundation of engineering knowledge but also prepare them to become leaders who can address the dynamic challenges in current construction industry, contributing to Mines' vision of developing innovative, sustainable, and impactful solutions for the built environment. Provide detail about how the course will be delivered: Residential (less than 50% of course delivered online) or Online. If online is listed, cite date of Mines Online development course. The course will be delivered 100% in person. The proposed course has been piloted in the Spring and Fall of 2024.

This course has been offered twice and has increased student interest and enrollment. Therefore, CEE is seeking a permanent course number for this course. The course would align with CEEN360, Introduction to Construction.

3.8

ME		Jeff Wheeler
CIM 1/15		
4 course changes:	MEGN315: DYNAMICS	
	Differential equations are used at the end of the course and can be taken (MATH225) as a coreq instead of a prereq.	
	MEGN391: INTRODUCTION TO AUTOMOTIVE DESIGN	

	Updating prereqs to make the class more accessible as an elective to non-ME students.
	MEGN417: VEHICLE DYNAMICS & POWERTRAIN SYSTEMS
	Updating prereqs to simplify the requirements to take this course, MEGN391 Intro to Automotive Design is sufficient; removed MEGN315, MEGN324, MEGN261.
	MEGN466: INTRODUCTION TO INTERNAL COMBUSTION ENGINES
	Removed MEGN471 Heat Transfer coreq to make the course more accessible to students before their senior year.

For MEGN315, the instructor felt MATH225 as a corequisite would give students more flexibility to register and differential equations are not used until the end of the class. For MEGN391, MEGN200 was listed as a prerequisite which is only taken by Mechanical majors. Removing this prerequisite would make the course more accessible to other majors, particularly EE majors. FOR MEGN417, the prerequisites were updated to simplify the requirements. FOR MEGN466, the instructor felt the Heat Transfer corequisite was pushing students to take it their senior year as MEGN471 is normally a senior class in ME. The instructor felt this was not needed and removing it would give more flexibility to students.

3.9

UHSP		Jack Bringardner/ Lakshmi Krishma
CIM 1/15; Provost 1/15		
4 new courses:	HNRS155: VERTICALLY INTEGRATED PROJECTS FOR EXPERIENTIAL RESEARCH	
	HNRS255: VERTICALLY INTEGRATED PROJECTS FOR EXPERIENTIAL RESEARCH	
	HNRS355: VERTICALLY INTEGRATED PROJECTS FOR EXPERIENTIAL RESEARCH	
	HNRS455: VERTICALLY INTEGRATED PROJECTS FOR EXPERIENTIAL RESEARCH	
	In Vertically Integrated Projects for Experiential Research (VIPER), teams of undergraduate students from various years, disciplines, and backgrounds work with faculty and graduate students on their efforts in scholarship and exploration. The teams are multidisciplinary – drawing students from the disciplines needed by each project; vertically integrated – maintaining a mix of undergraduate and graduate students from different cohorts; large-scale – often with more than 10 undergraduates per team; and long-term – undergraduates can earn academic credit in VIPER for up to four years, and the projects last for many years, even decades. This team structure provides sufficient time, the compelling context, and meaningful mentoring needed for students to learn and practice both technical and professional skills, from joining and learning about a team/project, through making significant contributions to the team/project, to leading part of or the entire team/project.	

	The essence of Vertically Integrated Projects for Experiential Research (VIPER) at Mines transcends traditional academic boundaries, merging technical expertise, business acumen, and a deep sense of passion and context. This multidisciplinary approach allows students to dive into authentic research and design experiences, fostering a unique sense of community, affinity, and belonging. Such projects encourage students to explore their areas of interest in depth and bring their ideas to reality, offering a platform for leadership development and a deeper understanding of societal and entrepreneurial challenges.

The Vertically Integrated Project and Experiential Research (VIPER) is funded by Student Signature Experience and is a long-term, large-scale project that unites undergraduate education with faculty research innovation. It is a team-based, curricular model where undergraduate students work on research projects that are based on faculty scholarships. While students are working on these projects, they are earning academic credit for participating in research. Most projects are interdisciplinary in nature. Ideally, students enroll in a VIPER team for 1-2 credits which requires student engagement for three semesters. This allows students to get acquainted with research and possibly pursue other funded research opportunities. VIPER is proposing four dedicated courses which would be repeatable for credit and taken over three semesters with the hope that when students have three credits, the department would count the VIPER engagement as a major tech elective (current plan in QBE). The courses would have closed enrollment, and students would need to apply to be on a VIPER team. A note was sent out to faculty that if interested in starting a team, seed funding could be requested. There is room for more teams so if interested, visit viper.mines.edu for additional information. Currently, there are five VIPER teams (E. Toberer – Renewal Energy Materials, M. Singh – Quantum Computing, T. Lowe – Nanotechnology, S. Pylypenko – Fuel Cells, and T. Williams – Ethical Human-Robotic Interaction). Additional information about these teams can be found on the VIPER website. One of the goals of this program is to build out a larger mixed team that becomes self-sustaining in ways where it helps the faculty member run the research program. Juniors and seniors on the team can also help onboard newer students, which provides more opportunities for student contribution. The course is letter graded, and students are assessed on their contributions to the team and their professional development. As students progress through the program, they receive more responsibility such as managing the team and mentorship. The program gives faculty a chance to engage with enthusiastic students, peer mentoring/leadership, access different majors, utilize a lower risk environment to develop ideas into reality for proposals or technology transfer, and attract/recruit graduate students. Additionally, the program provides benefits to students such as greater access to high impact practices, job placement similar to an internship/co-op, credit policies that increases mastery of discipline, and opportunities for leadership development and team skills.

- **Question:** G. Jin asked, how does this interfere with current undergraduate research project? Also, there are faculty who hire undergraduates as student contractors for doing research work. However, there was discussion in the Council a few years ago about not paying students to earn credit.
- **Answer:** L. Krishna answered that having multiple pathways for students to engage in research is a good thing overall. VIPER would not create competition but rather provide additional opportunities for onboarding students to research. It is also more accessible to various types of students.
- **Question:** G. Jin asked, do students who participate in VIPER but also receive MURF or SURF receive credit as well?
- **Answer:** L. Krishna answered that students are notified that they cannot double dip and cannot receive credit and get paid for the same research project.

- **Comment:** G. Jin added that it may be difficult to manage a research team that has varying circumstances (one student is being paid to do research and another is paying tuition for credit to do research).
- **Comment:** J. Bringardner added that there might be differing levels of engagements in terms of the type of students. A student in MURF may contribute substantially more effort compared to a student in doing 1 credit research. However, the VIPER model may encourage other research pathways (students are encouraged to join MURF or SURF and work full-time in the research lab during the summer). L. Krishna added that this is why VIPER is encouraging departments to recognize this as a tech elective to further incentivize students who are not part of MURF or SURF. J. Bringardner added that in most cases, students use the one credit to fill their credit hour load so they are not paying additional money for the credit. Because of the nature of the 19-credit maximum, this works well as students have a one credit buffer for this opportunity.
- **Question:** J. Wheeler asked, what is the assessment for the VIPER course for the letter grade?
- **Answer:** J. Bringardner answered that students will document every week what they do and what they accomplished via VIPER Notebook which is assessed at the middle and end of the semester. The grading components of the course also include the students' contributions and ability to work in a team. Students are also assessed by observations from the faculty member or graduate student managers, peer evaluations, individual documentation, and team documentation (poster presentation and final PowerPoint presentation).

Adjourn at 5:11 pm Ventzi Karaivanov

Next meeting: February 12th, 4:00-5:00 pm via Zoom. Please send agenda items to Ventzi Karaivanov (vkaraiva@mines.edu) and Kristeen Serracino (kristeen.serracino@mines.edu) one week prior.