Colorado School of Mines – GRADUATE COUNCIL MEETING MINUTES
January 15, 2025, 2:00 – 3:00 pm, GC224/Zoom

Attendees:

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

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

Other Regular Attendees and Guests

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

Special Guest(s):

Welcome John Spear

This is the first in-person Graduate Council meeting of the year. With the exception of the January 29th meeting, all future meetings will be in-person at 2:00 pm in GC224. The January 29th meeting will be held at 4:00 pm via Zoom only.

Briefings and Information Items

Office of Graduate Studies Carl Frick/Jenny Briggs

No updates at this time.

Registrar's Office Paul Myskiw

Today is the last day to drop/add courses. There are currently 952 students taking graduate courses this semester, which is higher than normal. The number has grown over the past couple of years as this number includes a combination of 4+1 students and students opting to take graduate level courses.

- **Question:** J. Spear asked, is there a number of students who stay enrolled in more graduate level coursework?
- **Answer:** P. Myskiw answered that the change in policy introduced last year was triggered by financial aid regulations which do not allow undergraduate aid to be used for graduate credit. Mines has always had a fair number of undergraduate students who take 500-level courses and do not pursue a master's degree which is able to be covered by aid. However, as the 4+1 programs have become more popular and rules regarding double counted courses have been changed, there is more interest in graduate level course enrollment.
- **Question:** J. Spear asked, is the financial aid requirement a federal or state requirement?
- **Answer:** P. Myskiw answered that it is a federal requirement.
- **Comment:** B. Voelker added that students have been advised that if they are interested in a combined program to take a 500-level course first.
- **Comment:** P. Myskiw added that students can get permission before they are admitted to a

combined program.

Graduate Student Government Ellie Miller

E. Miller will be taking over K. Tomon's position as GSG representative for the spring semester. Upcoming GSG events include the Spring BBQ and GRADS (April 1-3). Additionally, GSG is thinking about the signature graduate student experience and how GSG can continue to elevate that going forward. GSG will be hosting a department cup to encourage community building and friendly competition between departments.

Continued Business

1.1 **MME** Kip Findley
[CIM 11/21]
1 new course: **MTGN540: MAGNETIC MATERIALS AND MODERN TECHNOLOGIES**

Magnetism is a fundamental property of materials that is essential in their implementation in technology. However, few institutions incorporate magnetism into the curriculum for more than a single class period. By offering this course, Mines demonstrates the breadth of its expertise in materials to make it a top-of-mind institution for materials science and engineering. The Metallurgical and Materials Engineering department has thematic strengths in characterization of materials properties, and this course supports those areas, which also improves the scale and impact of Mines in these focus areas.

This is a graduate level cross-listing of an existing undergraduate course (MTGN440). This course will have additional requirements for graduate students including a paper and an experiment.

- **Question:** J. Spear asked, how many students are enrolled in the undergraduate level course? How many graduate students will be enrolled?
- **Answer:** K. Findley answered approximately 10-15 students in the undergraduate level course. Numbers are not provided yet but probably 5-10 graduate students will be enrolled.
- **Question:** J. Spear asked, overall, is this course good for the MME department?
- **Answer:** K. Findley answered yes, this is good for the MME department as this is a new area of specialty and an important area for students to dive into.
- **Comment:** J. Spear asked, as more combined undergraduate/graduate courses are created, what is the best way to do this? With the introduction of AI tools, an additional written project for graduate students may not be the best option. Would oral exams be better?
- **Comment:** U. Greife added that he requires a longer presentation on a topic of the students' choice. The undergraduate students will do a typical APS style, 10-minute presentation whereas the graduate students will do a 30-minute presentation. This requires the graduate students to go much deeper into the topic they are presenting.
- **Comment:** A. Marshall added that it will be important to not only push more volume for graduate students but also push them to do more independent research so that they not only do more writing and critical thinking but also get more practical experience in being an independent scholar.
- **Comment:** M. Belviranli added that a possible obstacle is finding a TA that has taken the graduate version of the course. The CS department has used a flexible term project for graduate students.
- **Question:** K. Findley asked, does OGS have a list of options to use for these courses? It would be good to have some uniform way to evaluate these courses or have a policy to refer to.

- **Answer:** J. Briggs answered that OGS does not have this yet. When this change was implemented, it was assumed that departments would oversee this individually, but it would be good to have some baseline criteria that could help with consistency. This might be a good thing for the Council to crowdsource ideas and recommendations such as a guidance document.
- **Comment:** R. Venturelli added that it would be good to have a separate set of learning objectives to encourage higher cognitive learning for graduate students.
- **Comment:** J. Briggs added that the Ethics Across Campus (EAC) committee has developed some criteria for the minimum requirements for a course to meet an ethics training requirement. It might be good to get some input from them as Council thinks about this.
- **Comment:** B. Voelker added it will also be important to take into consideration any HLC requirements and/or guidelines for 500-level courses.

1.2 **CBE** Nikki Farnsworth
[CIM 11/26]
1 new course: **CBEN528: ADVANCED REACTOR DESIGN**

Professor Thornburg, whose full-time role is as a Senior Reaction Engineer at the National Renewable Energy Laboratory (NREL), has created a highly unique senior undergraduate and graduate student elective course on chemical reaction engineering and its applications to the worlds of research & development and next-generation manufacturing. Reaction engineering has become an increasingly rare discipline due to retirement waves, and very few practitioners have the means or opportunity to teach a unifying course on such an challenging subject matter. This elective teaches a survey of over 16 different types of real-world chemical reactors—both traditional units as well as emerging, renewable-energy-powered reactors—synthesizing information from over 185 peer-reviewed research articles, papers and scholarly texts. For each reactor type, this one-of-a-kind course curriculum emphasizes conceptual chemical engineering design principles and practical scale-up strategies to teach students how to derive the information required to successfully deploy the technology. Overall, this course prepares Mines students for career paths in applied academic or industrial research & development environments that demand knowledge of the design and commercialization of cutting-edge chemistry technologies. The course has been taught to completion once in-person in Spring 2024 (cross-listed as a CBEN 498/598 Special Topics elective) with exceptional student reviews, and it is currently being taught for a second time in Spring 2025. We seek to make it a permanent part of the Mines course catalog to be offered annually to seniors and graduate students. To the best of the Chemical and Biological Engineering (CBE) Department's knowledge, no academic course like this exists anywhere else within U.S. chemical engineering programs, offering a highly differentiated curriculum for Mines CBE.

This course was designed by a faculty at NREL who collaborates with the CBE department frequently. This course has been taught once at the undergraduate and graduate level and is currently being taught this spring. The course builds upon reactor design, which is a core engineering course which will help prepare students.

- **Comment:** K. Findley added that this course could be good for MME and MN students.
- **Question:** J. Spear asked, what is the best way to advertise this course to other departments?
- **Answer:** K. Findley answered that this may be up to the Council to circulate this course to their respective departments once the course is approved.
- **Question:** U. Greife asked, could the title of the course be updated to indicate this course is not about nuclear reactors?
- **Answer:** N. Farnsworth answered that if specific kinds of reactors are added to the title of the

course, it would limit the professor from bringing up the state-of-the-art reactors that come online which is why he intentionally left the course title broad. The course is meant to be an advanced level survey of current research and industrial practice.

- **Comment:** B. Voelker added that something would need to be submitted in CIM to show how this course would be distinguished from the undergraduate course.
- **Question:** A. Osborne asked, are there any simulations or experiments done assigned in this course?
- **Answer:** N. Farnsworth answered there are no simulations or experiments.
- **Comment:** A. Osborne added that the Nuclear Reactor Design course is simulation based and may be a good option to differentiate the course from the undergraduate level course.

1.3 **GE** Ryan Venturelli

[CIM 12/2]

2 program changes: **CRTG-GISG: GRAD CERT IN GIS & GEOINFORMATICS**

Focuses efforts and bring greater clarity and flexibility for students by removing the four specialization areas and having only one certificate program.

XMS-GISG-NT: MSNT IN GIS & GEOINFORMATICS

Bring greater clarity to program expectations and requirements by updating course list with updated course numbers; added GEGN579 to elective list.

Formerly, the GIS graduate certificate had four areas of specialization. The program change would remove the specialization areas to make it only one certificate program. This ensures that students can complete the certificate program and coverage of courses. The MSNT program change is adding GEGN579 to the elective list.

- **Question:** J. Spear asked, is there a long-term plan in place in case the faculty member that runs this program retires?
- **Answer:** R. Venturelli answered that there has not been long-term plans made of who will teach these courses in the future. When the faculty member was on sabbatical last spring, one of her graduate students taught the course for her. However, there is a need to expand people with GIS expertise to support this program.
- **Question:** K. Findley asked, are external students taking GIS courses? Is this a marketing opportunity to reach this demographic of student?
- **Answer:** R. Venturelli answered yes, especially since many of these courses are offered online.

New Business

2.1 **CEE** John Spear for Lori Tunstall

[CIM 12/5]

1 course change: **CEEN513: ADVANCED GEOMATERIAL MECHANICS**

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

[CIM 12/19]

1 course deactivation: **CEEN591: EROSION CONTROL AND LAND RESTORATION**

Professor teaching this course cannot offer this course in person.

- **Comment:** R. Venturelli added that GEGN561 is still offered. Item 2.2 is a change request for GEGN561 which is combining GEGN561 and GEGN562. CEE will follow up with G. Walton to see if this revised course could still be used as a co-req for CEEN513.
- **Comment:** C. Frick added that the backlog of online courses has become substantial. Therefore, approval from the portfolio Dean is now required before departments can change a class from in-person to online.

2.2 **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.

2.3 **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.

- **Comment:** C. Frick added that there are no MSNT programs on campus that are below 30 credit hours.
- **Question:** K. Findley asked, has an analysis of the EE curriculum been carried out to trigger the credit hour change? Are students running out of courses to take after 30 credit hours?
- **Answer:** Y. Phal answered that the PhD program has three tracks and a required number of courses within each track. The goal is for students to complete the program within two years so reducing the credit hours would still be sufficient.

2.4 **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.

This course change is changing the course to a practicum which is a better definition of the work that is done in the course.

2.5 **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.

The certificate program changing is updating the total credits from 12 to 9 to align with other certificate programs and more aggressively market this program to industry mineral labs and mining companies. The MS program change is reducing the total credits from 36 to 30 for more consistency and to be more economical for self-funded students.

- **Question:** J. Spear asked, how many students are in Geochemistry?
- **Answer:** J. Ranville answered there are currently 20 active students in Geochemistry.

2.6 **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.

The Chemistry department is trying to increase the number of graduate and advanced undergraduate electives. This course has been taught as a special topics course twice and will be offered at both the 400 and 500-level.

- **Question:** A. Osborne asked, could this course be potentially listed as an elective for NSE students?
- **Answer:** B. Voelker answered that it is part of the plan.

2.6 **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.

There is a pending clause regarding departmental rules on taking the alternative core courses. Until it is further discussed, CS students will still be required to request these courses as a replacement.

- **Question:** J. Spear asked, is the approval process for replacing courses difficult to manage?
- **Answer:** M. Belviranli answered a few requests have been received and it has not been too difficult to manage. This may change now that it will be more explicitly advertised.

Adjourn John Spear

Next meeting:
January 29, 4:00-5:00 pm via Zoom only. 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.

3.1 **Approval of Previous Minutes** – December 4, 2024 John Spear

3.2 **GE** Ryan Venturelli
[CIM 12/9]
2 course change: **GEOL517: DRILL CORE LOGGING FOR ECONOMIC GEOLOGY**

This is an update to the catalog description of an existing graduate field course. Update course title and course learning outcomes.

GEOL519: ORE DEPOSITS OF THE WESTERN US

This is an update to an existing graduate field course that traditionally took students to eastern Canada.

Due to the high per-student cost, a new course format has been developed that teaches students similar skills in ore deposit geology in Nevada and Arizona at significantly lower travel costs.

[CIM 1/2]

1 program change: **MEMSPHD-GEE: ME, MS & PHD IN GEOLOGY & GEOLOGICAL ENGINEERING**

Changing "core competencies" in lieu of perquisites to create consistency between the Geology and Geological Engineering programs (the latter currently uses this terminology). The current "prerequisites" are not really treated as prerequisites that actually need to be completed before admission. Rather, they are treated as baseline knowledge that typically is expected to be acquired during the graduate degree if not covered by previous undergraduate coursework (which is consistent with the "core competency" language currently used by the Engineering program).

3.4 **AMS** Ebru Bozdag

[CIM 1/6]

2 course change: **MATH530: INTRODUCTION TO STATISTICAL METHODS**

Adding MATH334 as a prerequisite which better prepares students to succeed in the course and aligns with what is listed for DSCI530.

MATH560: INTRODUCTION TO KEY STATISTICAL LEARNING METHODS I

Adding MATH335 as a prerequisite which better prepares students to succeed in the course and aligns with what is listed for DSCI560.

3.5 **MME** Kip Findley

[CIM 12/20, 1/13]

2 new courses: **MTGN505: MECHANICAL PROPERTIES OF MATERIALS**

Following the decision of the graduate school to not allow graduate students to take 400 level courses for graduate credit, this course is a graduate level version of MTGN445 - Mechanical Properties of Materials.

MTGN575: METALLURGY OF WELDING

This course combines both lecture and lab sessions to provide students with a comprehensive understanding of industrial welding and joining processes, with a particular emphasis on metallurgical principles. Through project-based training, students will gain hands-on experience with commonly used welding technologies. This approach aligns with the school's mission to deliver STEM-focused education and research that cultivates talent, generates knowledge, and develops solutions to serve industry and benefit society. Cross-list of MTGN475.

1 course change: **MTGN605: ADVANCED TRANSMISSION ELECTRON MICROSCOPY**

Updates to prerequisites: MLGN593 in place of MTGN505.

3.6 **EE** Yamuna Phal

[CIM 1/8]

1 course change: **EENG532: LOW TEMPERATURE MICROWAVE MEASUREMENTS FOR QUANTUM ENGINEERING**

Updating semester offering language in course description.

3.7 **DATA SCIENCE** Doug Nychka

[CIM 1/8]

2 program change: **MS-DSCI-NT: MSNT IN DATA SCIENCE**

Add some clarity for the program, especially for the large number of combined students in the program – adjusted the DSCI courses in the Data Modeling module to their cross-listed MATH prefix as well as the degree plan.

XMS-DSCI-NT: MASTERS IN DATA SCIENCE (ONLINE)

*Aligning with changes to residential version by adjusting the DSCI courses in the Data Modeling module to their cross-listed MATH prefix. Also correcting the professional development credit number to three for the credits to add up correctly***.**

3.8 **CCUS** Yilin Fan

[CIM 1/8]

1 program change: **XCRTG-CCUS: CARBON CAPTURE, UTILIZATION, AND STORAGE**

Updating elective options to reflect additional courses now available.