Colorado School of Mines – GRADUATE COUNCIL MEETING AGENDA
November 1, 2023, 4:00 – 5:00 pm, via Zoom

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Attendees:
Voting Members: 16 total (10 - majority needed for quorum). Quorum was present.

P	Soutir Bandyopadhyay (Chair)	P	Danielle Ostendorf (LB)	P	Andy Osborne (NSE)		Owen Hildreth (ME)
P	Adrienne Marshall (HSE)	P	Bettina Voelker (CH)		Jaeheon Lee (MN)	P	Jared Carbone (EB)
P	Yaoguo Li (GP)	P	Juan Lucena (EDS)		Jim Ranville (GC)	P	Pejman Tahmasebi (PE)
P	Suveen Mathaudhu (MME)	P	Zhexuan Gong (PH)		Ryan Venturelli (GE)	P	Dong Chen (CS)
P	Adrianne C. Kroepsch (HASS)	P	Nikki Farnsworth (CBE)	P	Rena Zhu (GSG)	P	Reza Hedayat (CEE)
			Yamuna Phal (EE)		Gabriel Walton (UCTE)		

Other Regular Attendees and Guests

P	Tim Barbari (OGS)		Carolyn Freedman (OGS)		Jenny Briggs (OGS)		Vibhuti Dave (UG)
	Wendy Adams (HNRS)		D. Scott Heath (RO)	P	Paul Myskiw (RO)		Roxane Aungst (OGS)
P	Sam Spiegel (Mines Online)		Suzanne Beach (Payne)		Jen Gagne (Grad Admissions)	P	Kendra Stansbury (RO)
	Jon Johnson (Mines Online)		Atef Elsherbeni (EE)		Richard Krahenbuhl (GP)		Valerie Holt (AES)
						P	Kristeen Serracino

Special Guest(s): Doug Nychka, Lori Tunstall

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Welcome   Soutir Bandyopadhyay

Briefings and Information Items

Office of Graduate Studies   Tim Barbari
OGS just brought on a graduate contact manager. It's a new role to oversee all graduate contacts across all departments and programs and to make sure we are all complaints with fellowships, RA's, and TA's. This role will also assist in TA tuition budgets which are now under OGS. The new role is Rachel Adams.

Registrar's Office   Paul Myskiw
Welcome Kristeen Serracino, the new Program Assistant I for Academic Affairs/Registrar's. We turned on the new schedule of classes for the Spring semester on Monday 10/30.

Graduate Student Government   Rena Zhu
We are hosting our Town Hall next Wednesday (11/8). We are still debating if we should extend invitations to faculties. We are fundraising for grads, which is a research symposium we host on Mines campus. We've received great feedback from students who participated in it in the past.
        Question: When will the symposium be?
        Answer: It will be next semester in April.

Continued Business
Master's in Data Science   Doug Nychka
This request is to add an online version of the Data Science Masters that is the same as the current residential version. Thus, much of the justification included has been vetted from the original residential proposal. We also want to include a minor change to the current Data Science Masters to add a course.
        - **Question:** Have you submitted materials on CIM?

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- **Answer**: There is no submission on CIM.
- **Question:** Do you feel comfortable discussing something that is not submitted on CIM yet.
- **Answer:** No. We will postpone it until the next meeting (11/15). It will need to be a program change and a new program, so would require two submissions on CIM.
- **Question:** There was discomfort that was brought up in prior discussion regarding residential students taking online courses. Alot of courses are already offered online only that are taken by residential students. Have there been any problems/feedback from students?
- **Answer:** Some students have shared that they prefer residential courses over online courses. However, the online courses must meet a current standard through Trefny and, therefore, they are highly organized and well thought out. By and large, the students are happy with many of the intro courses being online.
- **Question:** There was mention during discussion that exams will not be updated for the online course. If not, what is the reason? Is it policy or lack of resources? Are you still committed to teaching these in-person courses for the students who are paying for in-person experience? What type of credits are professors overseeing the online course getting towards their teaching loads and service?
- **Answer:** There will be minor modifications, but the exams will not be updated. We have not heard that lack of resources is not a challenge. If the concern is cheating, data shows students who cheat, cheat, whether it's online or in-person. There will be two sections and we will give the option to the students to take it online or in-person.
- **Question:** What percentage of courses are currently offered online vs. in-person?
- **Answer:** There are currently 10 courses in the program. We are offering three statistics courses online. Three CS courses are in-person. The remaining four courses are electives which can be taken in either modality.
- **Comment:** We need to express caution when advertising resident programs taking online courses, specifically when it comes to non-resident students who pay out-of-state tuition. If they are expecting to take resident courses and the only option is online, it is important to note due to cost differentials. Also, if we're not offering an online course as an elective versus a required course that does not have a residential version, is there a different course they can take as a residential student?

Curriculum Item(s) for Council Vote

| 2.1 | **CIVIL & ENVIRONMENTAL ENGINEERING** | Reza Hedayat |

[CIM 9/23; Provost 09/23]

| **1 new course:** | CEEN478/578: EROSION CONTROL AND LAND RESTORATION |

Mines' Vision literally states leading to shared prosperity and sustainable use of Earth's resources", and the focus of this new curse is on sustainable soil management.

The course is oriented to graduate and undergraduate students from any field related to the management of soil resources, in which the relationship among soil, water, and plant is altered. The student will learn about erosion processes and how to control them. By the end of the course, the student should be able to: (1) Identify erosive processes affecting certain area; (2) Evaluate the level of soil erosion, its origin and consequences, to make further

management decisions; and (3) Select and design the most appropriate erosion control technique to apply, based on cost-effectiveness, giving emphasis to minimizing cost and maximizing environmental benefits (i.e. using plants as a main stabilization system).

MOTION: Motion to approve CEEN578 new course by Tina, seconded by Reza. Motion to approve CEEN578 new course was passed unanimously with zero abstentions.

1 course change: CEEN442/542: DESIGN OF WOOD STRUCTURES

(II) The course develops the theory and design methods required for the use of timber and masonry as structural materials. The design of walls, beams, columns, beam-columns, shear walls, and structural systems are covered for each material. Gravity, wind, snow, and seismic loads are calculated and utilized for design. Connection design and advanced seismic analysis principles are introduced. 3 hours lecture; 3 semester hours. Prerequisite: CEEN314 or equivalent.

MOTION: Motion to approve CEEN542 new course by Reza, seconded by Tiina. Motion to approve CEEN542 new course was passed unanimously with zero abstentions.

2.2   **CHEMISTRY**   Tina Voelker
             [CIM 09/27]
             1 new course: CHGN535: PHYSICAL BIOCHEMISTRY

This course stresses the importance of an interdisciplinary approach to science, discussing biological topics from the perspective of a physical chemist. It will expand and diversify the course offerings in the chemistry department, with a particular focus on serving the growing population of biochemistry and QBE students. Class for residential students, to be delivered in person.

MOTION: Motion to approve CHGN535 new course by Tina, seconded by Yaoguo. Motion to approve CHGN535 new course was passed unanimously with zero abstentions.

2.3   **COMPUTER SCIENCE**   Dong Chen
             [CIM 09/25; Provost 09/25]
             2 **new courses:**   CSCI577: ADVANCED ELEMENTS OF GAMES AND GAME
                                         DEVELOPMENT
CSCI477 is the undergraduate version of this course that has been running for years. In Spring 2022, a graduate version was introduced due to much student interest, and it ran in Spring 2022 and Spring 2023 as CSCI598 Special Topics. This proposal requests that the graduate course become a new permanent course in the catalog. This would be an in-person class only.

This advanced version of CSCI477 will contain the same content as that taught in the undergraduate version but with more challenging assignments as well as semester project team sizes of only 2 students. The students are also required to demonstrate their final game at the end of semester Innovation Fair. Additionally, this course will go deeper in the software engineering elements, including AI pathing algorithms, 2D game physics, 2D game lighting, 3D character movement, and architecting a game engine from scratch in C++. This

game engine project will be collaborative involving the whole class and the instructor, designing and developing a simple game engine using ideas from recent textbooks and industry. In accordance with the Mines@150 initiative, this course will also include 1-2 guest speakers from industry to talk about current gaming innovations.

This class is substantially different from other 500-level courses offered, such as Robot Planning and Advanced Graphics, in that it focuses solely on game elements and development. It will also have a collaborative class component of writing a game engine from scratch, giving the students more exposure to system architecture design.

MOTION: Motion to approve CSCI577 new course by Dong, seconded by Soutir. Motion to approve CSCI577 new course was passed unanimously with zero abstentions.

CSCI582: COMPUTING BEYOND CPU'S

The future of engineering and technology will run on AI and data analysis. Making "AI-based solutions run more efficiently in the field and on the cloud" is and will continue to be one of the important challenges that the industry needs to tackle. Having a class in our curriculum which aims to teach state-of-the-art practices to prepare the students for this challenge will contribute to the broader Mines strategic goal of being "a top-of-mind and first-choice university" by "expanding offerings and diversifying delivery".

MOTION: Motion to approve CSCI582 new course by Dong, seconded by Soutir. Motion to approve CCSI582 new course was passed unanimously with zero abstentions.

2.4	**ECONOMICS & BUSINESS**	Jared Carbone
	[CIM 09/20]	
	1 **new course:**	EBGN529: HEALTH SYSTEMS ENGINEERING ANALYTICS

Has EBGN529 been taught before?
o   The course has not been offered before.
Has the Trefny Center already approved this course?
o   Trefny is processing the course at this moment and passed its midterm review. The expectation is that it will be approved in the next couple of weeks.

CIM submission was not showing up for many. Paul and Kristeen will check into this issue.

MOTION: Motion to approve EBGN529 new course by Jared, seconded by Soutir. Motion to approve EBGN529 new course was passed unanimously with zero abstentions.

2.5	**GEOLOGY & GEOLOGIC ENGINEERING**	Ryan Venturelli
	[CIM 09/21; Provost 09/21]	Adrienne Marshall
	1 **new course:**	GEOL527: SWIR (SHORT WAVELENGTH INFRA-RED) SPECTRAL ANALYSIS

The SWIR spectral techniques have been used by the minerals industry for ~30 years now. It is a fast way to identify clay and other clay minerals, infer mineral compositions, estimate mineral formation temperatures, and reveal spatial trends to help understand a deposit and

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facilitate mineral exploration. Despite that it has been used widely in Australia, Canada and Latin America, the technique is to some degree under-used in the US and there has not been a training course on this technique at Colorado School of Mines. This course aims to fill this gap.
Objectives:
1. Use SWIR techniques to identify clay and other hydrous minerals
2. Use numerical SWIR spectral features to estimate compositions of certain minerals, to infer formation temperatures, and to reveal spatial trends
Learning Outcomes: The course contributes to the program goals in enhancing students' skills and capacities in mineral exploration.

MOTION: Motion to approve GEOL527 new course by Adrienne, seconded by Owen. Motion to approve GEOL527 new course was passed unanimously with zero abstentions.

3 course changes: CRTG-GISG: GRAD CERT IN GIS & GEOINFORMATICS

MOTION: Motion to approve CTRG-GISG course change by Adrienne, seconded by Soutir. Motion to approve CTRG-GISG course change was passed unanimously with zero abstentions.

GEGN588: ADVANCED PLANETARY GEOGRAPHIC
We are revising the course title and updating the syllabus accordingly to reflect the contents of the course more precisely. Planetary GIS is an emerging field: Moon, Mars, Jupiter/Saturn moon mapping. This will be one of the first courses to teach planetary GIS at Mines. GEGN588 is a cross-disciplinary class between GIS & Geoinformatics and Space Resources programs at Mines.

MOTION: Motion to approve GEGN588 course change by Adrienne, seconded by Soutir. Motion to approve GEGN588 course change was passed unanimously with zero abstentions.

INFORMATION SYSTEMS
XMS-GISG-NT: MSNT IN GIS & GEOINFORMATICS
Growing online MS-NT programs is in line with Mines @150 mission. This request adds two new (or newer) online courses to the program.

MOTION: Motion to approve XMS-GISG-NT course change by Adrienne, seconded by Yaoguo. Motion to approve XMS-GISG-NT course change was passed unanimously with zero abstentions.

2.6	**GEOPHYSICS**	Yaoguo Li

[CIM 09/25; Provost 09/25]

3 **new courses:**   CCUS525: BIOLOGICAL CARBON CAPTURE AND CONVERSION
This is an additional course for the CCUS certificate program, and so will expand offerings for professionals in a graduate program.

This course was designed by the Chemistry department as a service course to the CCU certificate program. This course should be proposed out of geophysics instead because it's geochemistry. We feel we would be overstepping our bounds if we proposed this change, so we are reverting to Chemistry to be internally vetted.

CCUS530: THE KINETICS OF CARBON DIOXIDE REACTIONS

This is an additional course for the CCUS certificate program, and so will expand offerings for professionals in a graduate program.

This course was designed by the Chemistry department as a service course to the CCU certificate program. This course should be proposed out of geophysics instead because it's geochemistry. We feel we would be overstepping our bounds if we proposed this change, so we are reverting to Chemistry to be internally vetted.

GPGN543: MINERAL EXPLORATION GEOPHYSICS

Geophysics is one of the most important tools in mineral exploration, especially in recent years when new discoveries are rarely on the surface. Modern exploration is more and more shifted to deposits under cover, with the cover being either rocks or sediments/vegetation. In such a condition, geophysical and geochemical exploration are typically the first passes of the exploration. While the geochemical exploration course has been offered in the Department of Geology and Geological Engineering, there has not been a geophysical mineral exploration course at Mines. This course will fill the gap.

The course is tailored for mineral exploration geologists who need geophysical tools, i.e., focuses on the application aspects of geophysics that are used in mineral exploration.

MOTION: Motion to approve GPGN543 new course by Yaoguo, seconded by Tina. Motion to approve GPGN543 new course was passed unanimously with zero abstentions.

2.7   **PETROLEUM ENGINEERING**   Pejman Tahmasebi
[CIM 09/27]
3 **course changes:**   PEGN515: ADVANCED RESERVOIR ENGINEERING
Updating the title to more accurately reflect the course content and differentiate it from UG course covering the basics of this topic.

PEGN517: ADVANCED DRILLING ENGINEERING

Changing the title to more accurately reflect the course content and differentiating it from UG course covering the basics of this topic.

PEGN605: ADVANCED WELL TESTING ANALYSIS

Changing the course title to more accurately reflect the course content and more clearly differentiate it from an UG course covering the topic basics.

MOTION: Motion to vote for all Petroleum Engineering course changes under one vote by Pejman, seconded by Gabe. Motion to vote for all Petroleum Engineering course changes under one vote was passed unanimously with zero abstentions.0

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MOTION: Motion to approve PEGN515, PEGN517, and PEGN507 course changes by Pejman, seconded by Gabe. Motion to approve PEGN515, PEGN517, and PEGN605 course changes was passed unanimously with zero abstentions.

12 deactivations: PEGN507: INTEGRATED FIELD PROCESSING
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN514: PETROLEUM TESTING TECHNIQUES
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN516: PRODUCTION ENGINEERING PRINCIPLES
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN523: ADVANCED ECONOMIC ANALYSIS OF OIL AND GAS PROJECTS
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN541: APPLIED RESERVOIR SIMULATION
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN542: INTEGRATED RESERVOIR CHARACTERIZATION
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN550: MODERN RESERVOIR SIMULATORS
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN595: DRILLING OPERATIONS
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN603: DRILLING MODELS
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN606: ADVANCED RESERVOIR ENGINEERING
This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN607: PARTIAL WATER DRIVE RESERVOIRS

This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

PEGN619: GEOMECHANICALLY AND PHYSICOCHEMICALLY COUPLED FLUID FLOW IN POROUS MEDIA

This course is no longer relevant in the Petroleum Engineering industry, and we want to focus our efforts on more applicable topics.

MOTION: Motion to vote for all Petroleum Engineering course deactivations under one vote by Yaoguo, seconded by Gabe. Motion to vote for all Petroleum Engineering course deactivations under one vote was passed unanimously with zero abstentions.

MOTION: Motion to approve PEGN515, PEGN517, PEGN605, PEGN507, PEGN514, PEGN516, PEGN523, PEGN541, PEGN542, PEGN550, PEGN595, PEGN603, PEGN606, PEGN607, and PEGN619 course deactivations by Yaoguo, seconded by Gabe. Motion to approve PEGN515, PEGN517, PEGN605, PEGN507, PEGN514, PEGN516, PEGN523, PEGN541, PEGN542, PEGN550, PEGN595, PEGN603, PEGN606, PEGN607, and PEGN619 course deactivations was passed unanimously with zero abstentions.

Adjourn   Soutir Bandyopadhyay

Next meeting: November 15, 2023, 4:00-5:00 via Zoom. Please send all agenda items to Soutir Bandyopadhyay (sbandyopadhyay@mines.edu) 1 week in advance.

Consent Agenda The following proposals will <u>not</u> 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.

2.1   **Approval of Minutes** – October 18, 2023   Soutir Bandyopadhyay