

Colorado School of Mines – GRADUATE COUNCIL MEETING MINUTES  
February 2, 4:00 – 5:00 pm, via Zoom

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**Attendees:**

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

P	Bettina Voelker (Chair)	P	Christine Baker (LB)	P	Andy Osborne (NSE)	P	Owen Hildreth (ME)
A	Eric Anderson (HSE)	P	Karin Leiderman (AMS)	P	Jamal Rostami (MN)	P	Michael Heeley (EB)
P	Ebru Bozdag (GP)	P	Juan Lucena (EDS)	P	Jim Ranville (GC)	P	Luis Zerpa (PE)
P	Geoff Brennecka (ML)	P	Zhexuan Gong (PH)	P	Danica Roth (GE)	A	Qi Han (CS)
A	Elizabeth Davis (HASS)	P	Dave Marr (CBE)	P	Maxwell Silver (GSG)	P	Lori Tunstall (UCTE / CEE)
P	Christine Morrison (CH)	A	Salman Mohagheghi (EE)				

**Other Regular Attendees and Guests**

P	Tim Barbari (OGS)	P	Carolyn Freedman (OGS)	A	Deb Jordan (Trefny)	P	Mara Green (AA)
A	Jennie Kenney (AA)	A	Denise Winn-Bower (PE)	P	Paul Myskiw (RO)	A	Kendra Stansbury (RO)

**Special Guest(s):** Tony Petrella (ME), Ning Wu (CBE), Brian Trewyn (CH)

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**Briefings and Information Items**

Office of Graduate Studies

Tim Barbari

*April 15 Resolution – Council of Graduate Schools*

Barbari reminded Councilors on the April 15 resolution upheld by the Council of Graduate Schools in that graduate schools should not pressure students to decide prior to April 15 on financial support. Barbari reported on anecdotes of letters with separate financial aid listing deadlines earlier than April 15. The graduate dean of Northwestern informed Barbari a student reported pressure to decide prior to the April 15 date; the resolution encourages graduate schools to call out colleagues when this occurs. The department had been informed. Barbari noted applicants are informed of the April 15 date but can provide earlier decisions to provide opportunities to other students. Other universities and programs with experience in yielding may offer more financial aid offers than slots knowing some will be turned down, this model works if there is a TA model for first-year support or if a program will float students in the first semester.

Question raised on deadlines for additional fellowships; Barbari stated that deadlines earlier than the April 15 date cannot be added to the communication. Some consideration to roll back programs sending separate financial offers and encourage use of the template available in Slate that refers to the Council of Graduate Schools resolution; this option is not preferred. Barbari encouraged programs not using the existent financial aid offer template in Slate, to upload a copy of the departments' offer letter.

*Catalog Change – 300-level Courses for Graduate Students*

Barbari noted if a program makes use of a 300-level course the course can be made into a 400-level course.

**MOTION:** To approve the proposed Catalog change to the language referencing graduate students' ability to take 300-level courses by Brennecka, seconded by Morrison. Motion passed unanimously.  
**APPROVED.**

Registrar's Office

Paul Myskiw

The course numbering and footnote additions to the Catalog approved at the 1/19 meeting await Faculty Senate approval.

No updates from the Graduate Student Government.

### **New Curriculum Item(s)**

- 1.1                    **MECHANICAL ENGINEERING**                    Carolyn Freedman  
[CIM 1/25]  
**1 program deactivation:** XCR-ADVMO: Graduate Certificate – Smart Manufacturing  
*Deactivating the Graduate Certificate in Smart Manufacturing due to:*  
*--recent departure of faculty member who would be teaching the required courses*  
*--lack of student interest*  
*May reconsider, when additional faculty member is hired and we can put more resources into recruiting for the certificate.*

Advice received from the Industry Advisory Committee that there had not been as much interest in degrees specifically for Smart Manufacturing, there had been a lack of student interest, and a faculty member expected to teach a large amount of the classes departed Mines.

- 1.1.1                    [CIM 2/1]  
**1 program change:**        CERTMS-ADVMAN: CERT & MS – Additive Manufacturing  
*Changing the name of the MSNT program to Additive Manufacturing as recommended by advisory committee and in keeping with student feedback and interest.*  
*Revising the MSNT Core Courses to reflect the focus on Additive Manufacturing.*

Advice received from the Industry Advisory Committee on the interest in Additive Manufacturing versus Advanced Manufacturing. The change aligned with student interest and feedback. The courses of the masters non-thesis core were updated to reflect a focus in Additive Manufacturing. The previous version of Advanced Manufacturing had two possible tracks: Additive and Smart, these have been consolidated into Additive Manufacturing. Additive Manufacturing is 3D printing.

Question on there core courses having not existed in the track before; the core courses were originally listed as electives.

- 1.2                    **PETROLEUM ENGINEERING**                    Luis Zerpa  
[CIM 1/31]  
**1 program deactivation:** MP-PMPRS: Professional Masters in Petroleum Reservoir Systems  
*The Professional Masters in Petroleum Reservoir Systems is recommended to be sun-setted. The program has attracted low applicant numbers primarily because the Petroleum industry does not generally support the Professional Masters degree. Also, while the Professional Masters program was intended for working professionals, many of the applicants are not employed and those who enroll generally want to convert to a thesis-based MS once they begin the program. Due to the low enrollment in the program, the required classes draw low registration.*  
  
*The participating departments, Geology and Geological Engineering, Geophysics and Petroleum Engineering are all in agreement on the sun-setting of the program. Currently*

*enrolled students (4) will be supported until the completion of their program.*

Reported low applicants for the program. Generally, the petroleum industry does not support or recognize professional master's degree. The professional master's degree was intended for working professionals; several recent applicants were not working professionals and would usually convert to the masters program.

Four students are currently enrolled; program will continue to support these students. The program will not be accepting new students.

Question on number of applicants in the current cycle; two applicants are being determined for admission. Barbari noted the program can be safely deactivated if the two students are not admitted into the program; admission can be denied due to sun-setting the program.

1.2.1 [CIM 1/31; Provost 1/31]

**1 new course:** PEGN518: ADVANCED PRODUCTION ENGINEERING  
*Production engineering is one of the three major areas in petroleum engineering. Previously, this course was not offered in PE due to the lack of a professor with expertise in this area. After the new hire of an assistant professor (instructor of this course) in this area in 2018, we offered this course twice in 2019F and 2021F as a "special topic", and had good enrollment numbers and evaluations. As production engineering is one of three major components in petroleum engineering besides drilling and reservoir engineering, we are pursuing to make this course an official graduate course. This course will broaden the area and specific expertise covered by PE and Mines, which advances Mines@150 Mission, Vision and Strategic Plans. The course will be offered in-person at Colorado School of Mines.*

1.3

**GEOPHYSICS**

Ebru Bozdag

[CIM 1/25; Provost 1/25]

**1 new course:** GPGN545: INTRODUCTION TO DISTRIBUTED FIBER-OPTIC SENSING AND ITS APPLICATIONS

*Distributed fiber optic sensing has become more and more important in the field of Geophysics, both in fundamental research and in the industry. This course will introduce this new technology to the students and demonstrate its applications through realistic field case studies. This course will be offered online as part of the petroleum geophysics certificate program.*

The new technology has become popular in geophysical monitoring and imaging. Special topics course was taught for two years and was part of the online petroleum geophysics certificate program. The course does not focus on petroleum geophysics; course has broader interest for industrial applications and basic research. Residential graduate students may enroll in the course, as well. The course is offered only online.

Question raised on the course's development with the Mines Online; course was offered online as a 598, additional information requested on the course's development status.

[CIM 1/25]

Ebru Bozdag

1.3.1

**1 course change:** GPGN590: INSTRUMENTAL DESIGN IN APPLIED

## GEOSCIENCES

- *Previous instructor departed Mines*
- *Expanding instrumentation applications from geophysics to more broadly geosciences*
- *Course now more welcoming to students in applied geoscience and related engineering disciplines, including environmental, civil, electrical, mining, petroleum, and mechanical engineering.*

The instructor of the course has departed Mines; new instructor sought to expand the scope of the course and be broader for students from various departments. Course focuses on instrument design in both sensors and software and has the potential to attract students from Computer Science, Electrical Engineering, Mechanical Engineering, and others. The course name was changed from Instrumental Design in Applied Geophysics to Geosciences.

Councilor noted this as a substantial change in content, as well, that may intersect with other departments.

Council participant noted instrumentation-related courses from areas like Physics or Mechanical Engineering and considering potential overlap; Bozdog stated the course will be focusing on geoscience problems.

Councilor noted Geology and Geological Engineering students that have taken instrumentation-type courses from other departments have found geological challenges not addressed and may be of interest to students in GE.

### 1.4 **QUANTITATIVE BIOSCIENCES AND ENGINEERING** Karin Leiderman

[CIM 2/1]

**1 program change:** MSPHD-BIO: MS & PHD – Quantitative Biosciences and Engineering

*Update to program to include new courses BIOL501: Advanced Chemistry and BIOL590: QBE Graduate Seminar, update to BIOL500, updates to course electives, removal of Independent Study as core course for the MSNT, and update to language throughout.*

The program electives were updated to reflect the addition of BIOL501. The Catalog entry had mentioned research credits instead of independent study credits for the masters non-thesis program, this was removed for clarity.

Councilor question on the addition of CHGN409/509 for the QBE electives; will be added.

#### 1.4.1 [CIM 2/1]

**1 course change:** BIOL500: CELL BIOLOGY AND BIOCHEMISTRY

*Update to course information to include the lab section, increased credits to four (4).*

Course credits updated. The lab had been taught with the course and was not listed in the Curriculum Inventory Management (CIM) system or Catalog.

#### 1.4.2 [CIM 2/1; Provost 2/1]

**1 new course:** BIOL590: QUANTITATIVE BIOSCIENCES & ENGINEERING GRADUATE SEMINAR

*The Quantitative Biosciences and Engineering (QBE) Graduate Seminar provides a forum for QBE graduate students to participate in seminars given by QBE professionals, develop an enhanced understanding of the breadth of quantitative bioscience disciplines, and present their research projects.*

The new graduate seminar will be required for graduate students and is a standard graduate seminar course.

- 1.4.3 [CIM 2/2; Provost 2/2] Brian Trewyn  
**1 new course:** BIOL501: ADVANCED BIOCHEMISTRY  
*This graduate course will be taught in-person to be consistent with the other core QBE graduate courses and the cross-listed chemistry course. With the growing interest in biological research and instruction on campus, along with the unique contributions Mines students and faculty can offer towards quantifying challenging biological phenomenon, we developed a series of new core courses in recent years to serve the QBE graduate courses. This course will follow BIOL500 in the graduate curriculum.*

The new course will be a required course in the QBE program core. The course has been taught twice as a 598.

Trewyn noted there is conversation with the Chemistry department to cross list and offer advanced biochemistry to chemistry graduate students. CHGN428 is incorrectly listed as the cross listed course and is to be updated in CIM. Changes in BIOL500 reflect the development of the BIOL501 course. BIOL500 is taken in the Fall prior to BIOL501; BIOL500 was developed as a means of providing introductory information for students without a biochemistry background.

QBE recognized students with sufficient biochemistry background may waive BIOL500.

- 1.5 **ECONOMICS & BUSINESS** Michael Heeley  
[CIM 1/27]  
**1 program change:** MS-ETM-NT: Engineering and Technology Management (ETM) Master of Science  
*In the "Further Degree Requirements" we have replaced the Economic Evaluation Workshop with an Introductory Python Programming Workshop to better prepare students for using Python in our quantitative classes. In addition, the material that was covered in the Economic Evaluation Workshop will be reviewed in the core class - EBG540 Accounting and Finance.*  
  
*We have also added EBG565 Marketing for Technology-Based Companies back to the Technology Management and Innovation Course list as we are able to offer it again.*

It was noted there were several programs integrating Python and the Python Programming Workshop was added to assist students in learning basic Python skills that can be used in quantitative classes. The workshop was piloted in the fall and well received. The Economic Evaluation Workshop material will be covered in the core class EBG540.

The workshops are four additional degree requirements for thesis and non-thesis ETM MS students, the workshops are not credit bearing.

EBGN565 had been removed from the program's list of electives due to inability to be offered, a new faculty member has provided the chance to reoffer the course.

- 1.6                    **ENGINEERING, DESIGN, AND SOCIETY**                    Juan Lucena  
[CIM 2/2]  
**1 program change:**        MSCR-HES: Humanitarian Engineering and Science  
*We are currently not able to provide all interested prospective students with graduate coursework that reflects their professional development goals. We are therefore proposing a broader array of "track" options for students who do not easily fit with our existing offerings.*
- Proposed revisions are to:*
- 1. Add a disciplinary track in Humanitarian Robotics*
  - 2. Add a disciplinary track in Data Science*
  - 3. Add an interdisciplinary track*
  - 4. Modify electives*
  - 5. Modify courses for geophysics disciplinary track*
  - 6. Modify courses for environmental engineering track*

The tracks have been added due to student demand. Applicants from Mechanical Engineering, Electrical Engineering, and Robotics programs had been turned down without the track offerings. The program electives were modified for flexibility. The initial proposal brought to Council had been too rigid and students and advisors had made a request for flexibility to create pathways for students depending on interest.

#### Continuing Curriculum Item(s)

- 2.1                    **CHEMICAL & BIOLOGICAL ENGINEERING**                    Ning Wu  
[CIM 1/7; Provost 1/7]  
**1 new program:**        XCRTG-CEPET: Chemical Engineering Processes in Energy Transition
- This program addresses specifically several Mines@150 goals by (1) fostering the education of engineering solutions in the societal context of producing use-inspired research and innovation to address industrial and societal challenges, (2) nurturing differentiated and desired STEM-educated leaders, and (3) providing STEM education for students and professionals in the area of energy production, storage, and associated environmental remediation. We sent out surveys to alumni from the Departments of Chemical Engineering and Petroleum Engineering in June 2021. The proposed online certificate program and its associated courses are well-received based on the feedback. This online certificate program is developed by leveraging existing and new online courses taught in the Department of Chemical & Biological Engineering and a course already approved by the online CCUS certificate program.*
- This Certificate program aims to provide students with much-needed working knowledge in addressing challenges in energy production (oil & gas), storage (electrochemical systems such as batteries), and associated environmental remediation (CO2 capture & storage). It is a subject that receives a wide range of interests from companies producing*



- 3.3 **APPLIED MATHEMATICS & STATISTICS** Karin Leiderman  
[CIM 1/26]  
**1 course change:** MATH510: ORDINARY DIFFERENTIAL EQUATIONS AND DYNAMICAL SYSTEMS  
*Prerequisites updated. Addition of MATH301.*
- 3.4.1 [CIM 2/1] Carolyn Freedman  
**1 program change:** MS-DSCI-NT: Non-Thesis Masters in Data Science  
*Revision to improve clarity under combined program description.*
- 3.4 **ECONOMICS AND BUSINESS** Michael Heeley  
[CIM 1/27]  
**1 course change:** EBG563: MANAGEMENT OF TECHNOLOGY AND INNOVATION  
*Title change to better reflect the course content and learning objectives. Also added the word "Lecture" to the catalog description. All else remains the same.*
- 3.5 **GEOPHYSICS** Carolyn Freedman  
[CIM 2/1]  
**1 program change:** XCRTG-CCUS: Carbon Capture, Utilization, and Storage  
*Revision made to wording around courses to provide clarity, no changes to actual program content.*
- 3.6 **MECHANICAL ENGINEERING** Carolyn Freedman  
[CIM 2/1]  
**1 course change:** MEGN545: ADVANCED ROBOT CONTROL  
*Update made to course Catalog description to better reflect course content and aims.*
- 3.7 **MATERIALS SCIENCE** Carolyn Freedman  
[CIM 2/1]  
**1 course change:** MLGN517: THEORY OF ELASTICITY  
*Update to course Catalog description to reflect correct course cross-listing (was listed as MLGN510, should be MEGN510).*
- 3.8 **GEOCHEMISTRY** Carolyn Freedman  
[CIM 2/1]  
**1 program change:** CRTG-GE: Certificate in Analytical Geochemistry  
*Revisions made to correct typos and minor text errors; clarifying language to the Combined program statement.*