Colorado School of Mines – UNDERGRADUATE COUNCIL MEETING MINUTES
January 11, 4:00 – 5:00 pm, via Zoom

Attendees:
Voting Members: 18 total (10 needed for quorum). Quorum was present.

P	Joseph Horan (chair)	P	Andrew Pederson (EB)	P	Mike Nicholas (AMS)	P	Chuck Stone (PH)
P	Michael Barankin (CBE)	P	Cortney Holles (HASS)	P	Corinne Packard (MME)	P	Nicole Smith (MN)
P	Dylan Domaille (CH)	P	Ge Jin (GP)	P	Rob Thompson (CS)	A	Dave Benson (GE)
P	Linda Battalora (PE)	P	*Shiling Pei (CEE) proxy for Hongyan Liu (CEE)	P	Oyvind Nilsen (ME)	A	Emmelia Ashton (USG)
P	Chelsea Salinas (EDS)	P	Brianna Buljung (LB)				

Other Regular Attendees and Guests

A	Sam Spiegel (Mines Online)	A	Dixie Cirillo (PA)	A	Mara Green (AA)	A	Kendra Stansbury (RO)
A	Karla Perez-Velez (CASA)	A	Vibhuti Dave (UGS)	P	Deb Jordan (Trefny Center)	P	Paul Myskiw (RO)
P	Katie Ludwin (CASA)	A	Danielle Boileau (CASA)	A	Cheryl Medford (GE)	A	Rachel McDonald (PE)
P	D. Scott Heath (RO)						

Special Guest(s): Kevin Cannon (GE), Scott Houser (EB), Tim Barbari (OGS)

Welcome Joe Horan

Approval of Minutes – December 14, 2022 Joe Horan

MOTION: To approve the Undergraduate Council minutes of December 14, 2022 by Barankin, seconded by Smith. Motion passed unanimously.

Briefings and Information Items

Office of Undergraduate Studies Vibhuti Dave

No updates from the Office of Undergraduate Studies.

Registrar's Office Paul Myskiw

The deadline for all changes to the Catalog has been extended to 4/21. All changes will need to be submitted and approved by this date; curriculum updates will be sent by Green with the updated Council schedule for February and March 2023.

Several questions had been directed to Myskiw on non-exam days and the meaning of non-exam days. Dave and Myskiw have worked with faculty and the Provost to provide clarifying language around review week and the definition of non-exam days.

- **Question** if changes to programs need to be submitted at the same time as core changes or if changes should be submitted altogether; Myskiw recommended that if changes are drafted submit them as soon as possible to save congestion in later Council meetings.
- **Question** if Senate and Council may continue working during the summer; Myskiw reported significant changes to core would be better within the physical Catalog rather than the

Addendum where they would appear if approved past the publication deadline.

Office of Graduate Studies — Tim Barbari

Barbari provided an update on the proposed changes to 4+1 language and combined programs. The HLC accreditation visit is expected; over the 2022 summer a deep dive was done into the criteria of accreditation. HLC has what are referred to as "Assumed Practices" and language for 4+1 and combined programs allows advanced undergraduate students to use graduate courses to substitute for required, technical, or free electives. Subsequently, the graduate courses can count toward a graduate degree. Mines allows double-counting of 400-level courses toward a graduate degree.

Majority of the discussion is being handled in Graduate Council; some general information on double-counting six credits is provided in the Undergraduate Catalog but the level is not defined. Barbari noted some programs allow 500-level technical courses in home department or adjacent departments can count as a technical elective. Some programs have only 400-levels as technical electives, forcing students to use free electives for double-counting. Barbari encouraged opening the language in the technical elective space.

Myskiw noted there are over one hundred undergraduate students taking 500-level courses every semester.

Barbari clarified that it would be unusual to list a 500-level as an undergraduate degree requirement. Suggestion made to identify departments or programs with problematic language that would need to be updated.

Curriculum Item(s) for Council Vote from 11/9/22

1.1 **APPLIED MATHEMATICS AND STATISTICS** — Mike Nicholas

[CIM 10/28; Provost 10/28]

1 new course: MATH324: STATISTICAL MODELING

1 course deactivation: MATH424: INTRODUCTION TO APPLIED STATISTICS

We just want to change the name and number of an existing course, and a new course proposal is the only way to do that. We'd like to change the name of MATH424 (Introduction to Applied Statistics) to "Statistical Modeling" to better fit in sequence with the follow up course "Advanced Statistical Modeling" (MATH436). The current name is vague and is quite similar to some of our other (vague) stats course names.

We'd also like to re-number this course as MATH324. A 300-level is more appropriate for where this course lies within the AMS BS programs.

MOTION: To approve the new course MATH324: Statistical Modeling and the course deactivation of MATH424: Introduction to Applied Statistics by Barankin, seconded by Nilsen. Motion passed unanimously.

1.2 **METALLURGICAL AND MATERIALS ENGINEERING** — Corinne Packard

[CIM 9/23]

1 course change: MTGN202: ENGINEERED MATERIALS

We are proposing to remove the Chemistry 2 pre-requisite requirement from this course for multiple reasons:

1- Having the pre-req was responsible for a large % of our departmental overrides, which were essentially automatically granted.
2- Removal of the pre-req allows for ease of Mechanical Engineering to still use this course in their major.
3- All course instructors agree that students not taking Chem 2 beforehand are not at a disadvantage in the course.

We also propose adding CHGN121 as a prerequisite for this course, as its content is necessary to student success in MTNG202. CHGN121 was a hidden pre-req before, as Chem 2 versions required it. Some version of Chem 2 remains required in our major, despite this pre-requisite change.

MOTION: To approve the course change to MTGN202: Engineered Materials by Packard, seconded by Barankin. Motion passed unanimously.

Minor Curriculum Changes –
The following minor course changes will not be discussed unless specifically requested by Council. Space Resources confirmed the proposed change for PHGN 324 would not affect its use as an elective in their ASI. Engineering, Design & Society confirmed the proposed change for MEGN 391 would not affect its use as an elective in the BS in Engineering Design.

1.3 **PHYSICS** Tim Ohno
[CIM 11/2]
1 course change: PHGN324: INTRODUCTION TO ASTRONOMY AND ASTROPHYSICS
Designation of "Spring" removed from course description and form; changed to Fall offering.

1.4 **MECHANICAL ENGINEERING** Oyvind Nilsen
[CIM 11/2]
1 course change: MEGN391: INTRODUCTION TO AUTOMOTIVE DESIGN
Course title change and Catalog course description change to better fit content of course. (Automotive Design:SAE Collegiate Design Series (Formula SAE) → Introduction to Automotive Design).

New Curriculum Item(s)

2.1 **APPLIED MATHEMATICS & STATISTICS** Mike Nicholas
[CIM 12/14]
1 program change: BS-AMS: BS in Applied Mathematics and Statistics
This is a small change for the Computational and Applied Math major. We are adding MATH324 to the list of required courses and removing MATH335 from that list. The feeling is that if a CAM major takes just one of these, MATH324 is more practical. We will include MATH335 on the elective list.

- **Question** on the course names of MATH324 and MATH335; MATH324: Statistical Modeling is a regression analysis class, MATH335: Introduction to Mathematical Statistics is a theoretical statistics and proof-based course.

2.2 **COMPUTER SCIENCE** Rob Thompson

[CIM 1/4]

4 program changes: MIN-COMPE: Minor in Computer Engineering

Adding new CSCI210 Systems Programming course to list of courses.

MIN-DSCI: Minor in Data Science

Updating responsible faculty and adding CSCI478 Bioinformatics to list of courses.

MIN-RIS: Minor in Robotics and Intelligent Systems

Replace Intro to Stats with Intro to Prob.

MINASI-CS: Minor in Computer Science

Deactivating ASI. Currently zero students enrolled and ASIs are rarely utilized across campus. Further, due to prereqs a student completing the existing ASI would need 1 more course to complete the minor. Second version of minor being rolled into Minor in Computer Engineering.

Changes are resulting from the new core.

- **Question** if the number of credits increases in the Minor in Data Science and Minor in Robotics and Intelligent Systems; Thompson reported the current number of credits would remain the same for the Minor in Robotics and Intelligent Systems. The courses added are additional choices.

2.2.1 [CIM 1/4; Provost 1/5]

1 new core course: CSCI128: COMPUTER SCIENCE FOR STEM

This course is considered part of the new Mines Core, and thus designated an essential class for all students studying at Mines. Increasingly each year, our society relies on computing technology to accomplish daily tasks. This is even more true for scientists and engineers in STEM fields. However, simply knowing how to use computers is not enough. Capable professionals must also know how to program computers to make the best use of them. This course will teach the basics of computer programming, targeting students with no prior experience. It will teach fundamentals that are necessary to program in any language, as well as data analysis techniques that will be applicable to all STEM students, regardless of their intended major. This is a residential course, meeting in-person 3 times each week.

This three-credit course would replace CSCI101/102 and proposed to be dropped in Fall 2023. The course would be required for all students as it is integrated into the new Mines core. Emphasis on the new course is to offer practical coding experience that is immediately useful to all students regardless of if they are intending to continue in a computing-related field. The course will teach Python and will be fully introductory without prerequisites and assumes basic mathematical knowledge and nothing beyond that.

2 new courses: CSCI195: CS@MINES BRIDGE SEMINAR COURSE

The CS@Mines Bridge Program is for students who have an undergraduate degree in a non-CS field and wish to pursue a CS Master's Degree. There is tremendous potential to have a positive impact on students as well as grow the graduate student pipeline within the Mines community and attract a diverse population of new students to enroll in Mines' CS programs. This Bridge Seminar course is required for all incoming Bridge Students, and has a direct connection to the Mines@150 mission to be a "top-of-mind

and first-choice university for students" and expand the pathways into Mines, and Computer Science by offering opportunities for "professionally oriented pre and post graduate education". This course will be delivered in a residential manner, with weekly in-person sessions. There will be a mixture of course instructor lectures, guest speakers, in-class group discussions and exercises to reinforce weekly topics.

One credit seminar course, non-core related. The course is related to the Bridge program preparing students coming in to earn a graduate degree that have not had a prior computer science degree. The course assists in catching students up on vital computing knowledge prior to joining the formal Bridge program.

CSCI210: SYSTEMS PROGRAMMING

To prepare students for upper-level courses better, thorough coverage of the Linux operating system concepts, from command line skills to writing code to perform system level management, is needed. To achieve these goals, this proposed 3-credit course will extend the existing 1 credit CSCI 274 Introduction to the Linux Operating System course and absorb topics from CSCI 101/102 that are not covered in replacement CSCI 128.

CSCI210 will replaced the current CSCI274: Introduction to the Linux Operating System. 210 will be a required course for the program. The course increases from one credit to three credits. Course will cover much of what was in 274 but will greatly expand it. It is meant as a bridge between some of the basic programming concepts students are doing at the 100 and 200-level and the more advanced and broad topics in the later stages of the degree.

The Linux operating system is covered, shell scripting, C-Coding, and additional concepts.

2.2.2 [CIM 1/4]

17 course changes: CSCI200: FOUNDATIONAL PROGRAMMING CONCEPTS & DESIGN

Updating prereq for new Mines core computing course CSCI128.

CSCI220: DATA STRUCTURES AND AGLORITHMS

Adding countability content as prereq.

CSCI250: PYTHON-BASED COMPUTING: BUILDING A SENSOR SYSTEM

Updating responsible faculty and adding new Mines programming course as prereq.

CSCI250 would be phased out due to the CSCI128 course; has been removed from several degree tracks.

CSCI303: INTRODUCTION TO DATA SCIENCE

Adding new Mines core programming course as prereq.

CSCSI306: SOFTWARE ENGINEERING

Updating responsible faculty and adding CSCI210 as additional prereq to fit into new major flowchart following new Mines core curriculum.

CSCI341: COMPUTER ORGANIZATION

Changing prereq from "CSCI200 or CSCI261, CSCI262" to "CSCI210".

CSCI358: DISCRETE MATHEMATICS

Changing prereq from Calc III to Calc II.

CSCI370: ADVANCED SOFTWARE ENGINEERING

Changing credit hours from 4.5 to 5.0 in response to no longer allowing half credit hours.

CSCI400: PRINCIPLES OF PROGRAMMING LANGUAGES

Updating responsible faculty and modifying prereq to be CSCI358 or MATH300 to add flexibility for CS Minors.

CSCI423: COMPUTER SIMULATION

CSCI425: COMPILER DESIGN

CSCI442: OPERATING SYSTEMS

Updating prereq to include new CSCI210 Systems Programming course in place of CSCI274 Intro to Linux OS.

CSCI470: INTRODUCTION TO MACHINE LEARNING

Adding new Mines core programming course as prereq.

CSCI471: COMPUTER NETWORKS I

Updating prereq to include new CSCI210 Systems Programming course in place of CSCI274 Intro to Linux OS.

CSCI473: ROBOT PROGRAMMING AND PERCEPTION

Updating responsible faculty member, title, and description to accurately reflect course content.

CSCI475: INFORMATION SECURITY AND PRIVACY

Changing prereq from "CSCI220 or CSCI262, CSCI341, CSCI274" to "(CSCI220 or CSCI262) and CSCI341 and (CSCI210 or CSCI274)".

CSCI478: INTRODUCTION TO BIOINFORMATICS

Adding new Mines core programming course as prereq.

- **Question** on when new sections of MATH334 would be expected; Thompson noted these changes would be expected for implementation in Fall 2023. Thompson reported there is not an expectation for large impact on the AMS department. Many changes are moving from requiring just MATH201 to MATH201 or MATH334.

2.3 **QUANTITATIVE BIOSCIENCES AND ENGINEERING** Lauren Salinas

[CIM 12/15]

1 program change: BS-QBE: BS in Quantitative Biosciences and Engineering

Update to technical electives list and removal of field session placeholder that was used in Summer of Junior year.

2.4 **CHEMICAL AND BIOLOGICAL ENGINEERING** Michael Barankin

[CIM 1/3]

1 course change: CBEN420: MATHEMATICAL METHODS IN CHEMICAL ENGINEERING

Updating/aligning course description (with CBEN505) to match how the course is currently taught.

A new faculty member is teaching the course along with the graduate components. Graduate component seeing more significant changes.

2.5 **CHEMISTRY** Dylan Domaille

[CIM 1/6]

13 course changes: CHGN209: INTRODUCTION TO CHEMICAL THERMODYNAMICS

Updating pre-reqs. Removed CHGN121 because that pre-req will be met if students have taken CHGN122/CHGN125.

CHGN224: ORGANIC CHEMISTRY II LABORATORY

Removing CHGN221 as a pre-req because this will already be met if CHGN222 (another pre/co-req) is being taken/has been taken.

CHGN335: INSTRUMENTAL ANALYSIS

Updated to include CHGN125 as a suitable substitute for CHGN122.

CHGN336: ANALYTICAL CHEMISTRY

Updating pre-reqs to include CHGN125 as a suitable substitution for CHGN122.

CHGN351: PHYSICAL CHEMISTRY: A MOLECULAR PERSPECTIVE I

Updating pre-reqs to remove CHGN121 and CHGN122 because these are pre-reqs for the existing pre-reqs of CHGN209/CBEN210.

CHGN406: INTRODUCTION TO GEOCHEMISTRY

Updating pre-reqs to remove CHGN121 (which will be met if the existing CHGN122 pre-req is met) and to add CHGN125 as a suitable substitution for CHGN122.

CHGN410: SURFACE CHEMISTRY

Updated to include CBEN210 (chem. eng. thermo) as a suitable substitution for CHGN209 (chemistry thermo).

CHGN411: APPLIED RADIOCHEMISTRY

1) Removed the CHGN121 requirement because this will be met if the existing CHGN122 pre-req is met. 2) Added CHGN125 as a suitable substitution for CHGN122.

CHGN428: BIOCHEMISTRY

Adjusted pre-req to include concurrent enrollment of CHGN222 (Organic Chemistry II). This change is supported by the chemistry faculty, including those who teach CHGN428 (Posewitz, Morrison, Trewyn, Domaille).

CHGN431: INTRODUCTORY BIOCHEMISTRY LABORATORY

Clarified pre-reqs to CHGN428 or concurrent enrollment.

CHGN441: THE CHEMISTRY AND BIOCHEMISTRY OF PHARMACEUTICALS

CHGN445: CHEMICAL BIOLOGY

Removed CHGN221 pre-req because it will have been met if CHGN222 (current pre-req) is met.

CHGN490: CHEMISTRY FIELD SESSION

Updating pre-reqs to require Physical Chemistry I (CHGN351) but not Phys. Chem. II (CHGN353). This change was made because biochemistry majors do not have to take Phys. Chem. II, but do have to take field session. Not having had CHGN353 does not negatively impact students' ability to complete CHGN490 but does require a lot of course overrides. This change was voted on and supported by the chemistry faculty.

Changes were made to bring courses in line with current naming conventions. The most substantial change is made to CHGN490 where the requirement of physical chemistry II is being dropped. Biochemistry majors, comprising a majority of the majors within CH, do not take this course. Department noted it is not necessary for student success in the field session. Physical chemistry I has been made the requirement for the course.

2.6 **ECONOMICS AND BUSINESS** Becky Lafrancois

1 program change: BS-BEMS: Business Engineering and Management Science

Submitted as a memo within the Council Canvas page to outline the implementation of the new courses proposed below. The BS had been built around courses that were offered on campus at the time. New

faculty have been hired that have significant expertise in business analytics. The curriculum is being redesigned to better align with what is going on in the business analytics industry.

Currently, the BS offers a data science core that requires eighteen hours of classes. A new proposed data science core would be offered, without a change to the hours. The new proposed core would replace courses that are non-specific to business analytics. An introductory course, course in predictive analytics, course in prescriptive analytics, and the Capstone would replace the requirements of linear algebra; linear programming, and stochastic models. Lafrancois noted there may be a credit reduction overall as the new core is implemented.

- **Question** in the drop of linear algebra and how many students are expected per year; Lafrancois reported there may be a small decrease.

[CIM 12/14; Provost 12/15]

5 new courses: EBGN280: INTRODUCTION TO BUSINESS ANALYTICS

Business analytics implements a data-driven approach to the business world, leveraging statistics and data modeling to generate new business insights. Currently, many of the world's largest companies use business analytics. Due to the increasing demand for business analytics in different industries, an increasing number of schools now offer business analytics courses. This course contributes to Mines@150's mission by strengthening the students' business education.

EBGN351: INTRODUCTION TO DECISION SCIENCE

One of the key goals for Mines@150 is to have all students graduate with a good understanding of the business applications of their degrees. Running a business or working in a business primarily comes down to making decisions – strategic decisions, capital investment decisions, and operational decisions. Decision Science provides the framework needed to think one's way through complex problems and make good decisions.

EBGN381: PREDICTIVE BUSINESS ANALYTICS

Predictive analytics may be helpful and profitable in almost any industry, from the banking to the aerospace industry. Predictive models enable businesses to make data-driven decisions that minimize potential risks and maximize profitability. Predictive models are used to forecast inventory, manage resources, set ticket pricing, manage equipment maintenance, develop credit risk models, and much more. This course contributes to Mines@150's mission by strengthening the students' business education.

EBGN382: PRESCRIPTIVE BUSINESS ANALYTICS

The Prescriptive Analytics course provides skills on modeling business problems to obtain optimal decisions and insights, specifically in the business context. It contributes to Mines@150 Mission by contributing to the education in business, by providing skills to solve "the world's most pressing challenges".

EBGN490: BUSINESS ANALYTICS CAPSTONE

This course will serve as the culmination of the Business Analytics (data science) core within the Business Engineering and Management Science degree program. As part of the program proposal, we included a capstone experience for our students. This new course will serve as that capstone.

The proposed courses would be offered in a sequence that builds off of one another.

2.7 **ENGINEERING, DESIGN, AND SOCIETY** Chelsea Salinas
[CIM 12/21]
1 program change: MIN-LSR: Minor in Leadership in Social Responsibility
Update to course elective list for LSR minor. The Engineering for Community Development HE minor in EDS also lists elective courses which should be consistent between the two offerings.

An elective course had been left off of the list when originally submitted in CIM.

Continuing Curriculum Item(s) – from 11/9/22

Minor Curriculum Changes –
The following minor course changes will not be discussed unless specifically requested by Council. All proposed changes make courses more accessible (e.g., remove prereqs, minimize RAFs) to students and only affect the departments making the proposed changes and elective courses for Design Engineering.

3.1 **CHEMICAL AND BIOLOGICAL ENGINEERING** Michael Barankin
[CIM 11/30]
5 course changes: CBEN310: INTRODUCTION TO BIOMEDICAL ENGINEERING
The CBEN210 prereq excludes new QBE students because they do not need it for their degree, replaced with Calc II which all students are required to take.
CBEN314: CHEMICAL ENGINEERING HEAT AND MASS TRANSFER
Moving CBEN200 from prereq to coreq to enable students to take 200 a year later and still graduate in a reasonable time.
CBEN357: CHEMICAL ENGINEERING THERMODYNAMICS
CBEN358: CHEMICAL ENGINEERING THERMODYNAMICS LABORATORY
Department policy is already to accept CHGN209 as a course substitute, change made to reduce RAF forms.
CBEN402: CHEMICAL ENGINEERING DESIGN
Moving CBEN358 from a prereq to a coreq which, correspondingly, enables students to take CBEN200 a year later and still graduate in a reasonable time.

3.2 **MECHANICAL ENGINEERING** Oyvind Nilsen
[CIM 11/9]
1 course change: MEGN467: PRINCIPLES OF BUILDING SCIENCE
Removal of co-requisite MEGN471.

Adjourn Joe Horan
Meeting adjourned: 4:56 pm.
Next meeting: January 25, 4:00-5:00 pm via Zoom. Please send agenda items to Mara Green (mgreen1@mines.edu) one week prior.