

Council Approval

Note: This form is intended to track the progress of a proposal (whether from Academic Affairs or Health Sciences) through the Undergraduate and Graduate Councils.

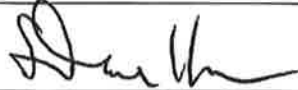
Proposal: Earth Resource Management PMST

This proposal needs to go through:

Undergraduate Council	☐
Graduate Council	☒
Both Approvals	☐
Grad Approval/Undergrad Notification	☐

This proposal has been approved by:

Chair of Undergraduate Council _____ Date: _____

Chair of Graduate Council  Date: 3/30/18

Once the appropriate signature(s) have been obtained, please forward this completed form to the Office of the Senior Vice President for Academic Affairs. *(NOTE: The SVP-AA is the Chief Academic Officer for the University of Utah and reports to the Board of Regents in this capacity. When necessary, the CAO will get a signature from the SVP-HSC.)*

Chief Academic Officer  Date: 4.3.18

Once the Chief Academic Officer's signature has been obtained, this approval document will be forwarded to the **Office of the Academic Senate**.

**Utah System of Higher Education
New Academic Program Proposal
Cover/Signature Page - Full Template**

Institution Submitting Request: University of Utah
Proposed Program Title: Earth Resource Management
Sponsoring School, College, or Division: The Graduate School
Sponsoring Academic Department(s) or Unit(s): Mining Engineering; Master of Science and Technology
Classification of Instructional Program Code¹: 14.2101
Min/Max Credit Hours Required to Earn Degree: 36 / 36
Proposed Beginning Term²: Fall 2018
Institutional Board of Trustees' Approval Date:

Program Type (check all that apply):

☐ (AAS)	Associate of Applied Science Degree
☐ (AA)	Associate of Arts Degree
☐ (AS)	Associate of Science Degree
☐	Specialized Associate Degree (specify award type ³ :)
☐	Other (specify award type ³ :)
☐ (BA)	Bachelor of Arts Degree
☐ (BS)	Bachelor of Science Degree
☐	Professional Bachelor Degree (specify award type ³ :)
☐	Other (specify award type ³ :)
☐ (MA)	Master of Arts Degree
☐ (MS)	Master of Science Degree
☐	Professional Master Degree (specify award type ³ :)
☒	Other (specify award type ³ : MST)
☐	Doctoral Degree (specify award type ³ :)
☐	K-12 School Personnel Program
☐	Out of Service Area Delivery Program

Chief Academic Officer (or Designee) Signature:

I, the Chief Academic Officer or Designee, certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

Please type your first and last name _____ Date: _____

☐ I understand that checking this box constitutes my legal signature.

¹ For CIP code classifications, please see <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>.

² "Proposed Beginning Term" refers to first term after Regent approval that students may declare this program.

³ Please indicate award such as APE, BFA, MBA, MEd, EdD, JD

**Utah System of Higher Education
Program Description - Full Template**

Section I: The Request

University of Utah requests approval to offer the following Master's degree(s): Earth Resource Management effective Fall 2018. This program was approved by the institutional Board of Trustees on .

Section II: Program Proposal

Program Description

Present a complete, formal program description.

This program of study will be developed to provide education specifically for management and leadership in the resource industries. The degree will be designed for individuals with undergraduate degrees in engineering and the physical sciences, but also open to those in business or communications who have strong technical backgrounds. The program will provide instruction in the science and technology of resource utilization, as well as in finance, economics, management, leadership, law, and innovation. Additionally, students will be able to include important concepts of sustainability, social responsibility, and cultural sensitivity in their courses of study. Students will have flexibility to align their individual programs of study with their professional interests. It will be an inherently interdisciplinary program.

We propose the name Earth Resource Management (ERM). Students will earn a Master of Science and Technology degree which will be awarded from the College of Mines and Earth Science.

Consistency with Institutional Mission

Explain how the program is consistent with the institution's Regents-approved mission, roles, and goals. Institutional mission and roles may be found at higheredutah.org/policies/policyr312/ .

Addition of the Earth Resource Management track to the PMST program aligns well with the University's mission to "advance rigorous interdisciplinary inquiry, international involvement and social responsibility, and integrate global and sustainability goals and principles across the institution."

Section III: Needs Assessment

Program Rationale

Describe the institutional procedures used to arrive at a decision to offer the program. Briefly indicate why such a program should be initiated. State how the institution and the USHE benefit by offering the proposed program.

Executives and managers of resource production companies are often drawn from the companies' technical employees. The technology used in resource production is complex, and it is often thought that technically trained employees are best qualified to "run the company." The implicit assumption is that technically competent individuals can learn the additional skills (financial, social, political, and cultural) that are required in good management. In some cases, resource production companies look for experienced engineers or scientists who also have advanced management training—for example, an M.B.A. In other cases, technical personnel

promoted to management are given training by the company—a six-week course at Harvard, M.I.T., or some other prestigious institution. Both of these approaches rely on the individual to combine technical education and skills with business education, often with little guidance in how to do that successfully. In particular, the challenges unique to the resource production industries are often not fully addressed.

Earth's resources can be considered in three categories: captured or reusable—sun, wind, rain, tides, etc.; nurtured or renewable—ecosystems, including soils, plants, animals, etc.; and extracted or depletable—mineral deposits, including oil and gas.

All of these resources are used by humans, for sustenance and for improvement of the quality of life. Increasing human population and the continuing extraction of depletable resources may lead to shortages of key commodities, unbalanced markets with wide price swings, and economic depression in areas where those resources are depleted. In addition, some resources may be used or extracted without adequate consideration of the influence of that use on other resources.

Until recently, all of the earth's resources were treated as infinite, and the use of those resources proceeded accordingly. In particular, the extraction of mineral resources was conducted to maximize profits as quickly as possible—a practice known as “high grading”—with little thought of the resultant influences on other resources. For true sustainability, an integrated, holistic approach to resource usage must be developed and implemented. That approach will necessarily incorporate the knowledge and methods of many disciplines—in the sciences, engineering, business, law, and humanities.

Sustainable management of earth's resources will include five important components: people, resources, innovation, cooperation, and leadership. The courses of study in the proposed new degree will be designed to prepare professionals in all of these components of sustainability.

Labor Market Demand

Provide local, state, and/or national labor market data that speak to the need for this program. Occupational demand, wage, and number of annual openings information may be found at sources such as Utah DWS Occupation Information Data Viewer (jobs.utah.gov/jsp/wi/utalmis/gotoOccinfo.do) and the Occupation Outlook Handbook (www.bls.gov/oco).

Salt Lake City ranks third in metropolitan areas with the highest employment level of mining and geological engineers.

For Salt Lake City, UT, the employment per thousand jobs is 0.31 with a annual mean wage of \$86,250.

Nationally, the number of mining and geological engineers, including mining safety engineers is expected to increase from 7,300 in 2016 to 7,900 by 2026. [2] Employment growth is expected to similar to the national economy.

[1] Bureau of Labor Statistics, "Occupational Employment Statistics," 5 2016. [Online]. Available: [https://www.bls.gov/oes/current/oes172151.htm#\(1\)](https://www.bls.gov/oes/current/oes172151.htm#(1)). [Accessed 27 12 2017].

[2] Bureau of Labor Statistics, "employment by detailed occupation," 2016. [Online]. Available: https://www.bls.gov/emp/ep_table_102.htm. [Accessed 28 12 2017].

Student Demand

Provide evidence of student interest and demand that supports potential program enrollment. Use Appendix D to project five years' enrollments and graduates. Note: If the proposed program is an expansion of an existing program, present several years enrollment trends by headcount and/or by student credit hours that justify expansion.

Student demand is expected to be regional based on employment. Employment for mining and geological engineers by county has strong employment in Utah (Salt Lake and Tooele counties) as well as the neighboring states of Arizona, Colorado, Nevada and Wyoming.

Typical of most engineering professions, the majority of workers have a bachelor's degree; however, a substantial fraction, ~25%, have a master's degree.

Similar Programs

Are similar programs offered elsewhere in the USHE, the state, or Intermountain Region? If yes, identify the existing program(s) and cite justifications for why the Regents should approve another program of this type. How does the proposed program differ from or compliment similar program(s)?

Similar Programs

No similar programs were identified in the USHE system, Utah or the Inter-mountain region. The Colorado School of mines does offer a M.S. in Engineering and Technology Management; however, this degree is not a technical degree—focusing on finance and management. The degree is offered through their division of Economics and Business. The proposed ERM program of study will require a majority of the course work be STEM focused.

Six schools in the western and southwestern U.S. were examined for similar programs:

- Colorado School of Mines
- Montana Tech of the University of Montana
- University of Arizona
- University of Nevada: Reno
- Utah State University

Below, each school and its corresponding degree programs are identified:

Colorado School of Mines

- Mining and Earth Systems Engineering, M.S., Ph.D. (Department of Mining Engineering)
- Engineering and Technology Management, M.S. (Department of Economics and Business)

- Environmental Engineering Science, M.S., Ph.D. (Department of Civil and Environmental Engineering)
- Mineral and Energy Economics, M.S., Ph.D. (Department of Economics and Business)

Montana Tech of the University of Montana

- Environmental Engineering (M.S.)
- Mineral Processing Engineering (M.S.)
- Technical Communication (M.S.)
- Project Engineering and Management (M.S.)
- Interdisciplinary Master of Science (M.S.)

University of Arizona

- Environmental Engineering (M.S., Ph.D.)
- Fundamentals of Mine Operations and Economics (Certificate)
- Mining Geological/Geophysical Engineering (M.S.)
- Mine Production and Info Tech (Certificate)

University of Nevada: Reno

- Environmental Sciences (M.S., Ph.D.)
- Geo-Engineering (Ph.D.)
- Land Use Planning (M.S.)
- Mining Engineering (M.S., Ph.D.)

Utah State University

- Applied Environmental Geoscience (M.S.)

Collaboration with and Impact on Other USHE Institutions

Indicate if the program will be delivered outside of designated service area; provide justification. Service areas are defined in higher.utah.edu/policies/policy315/. Assess the impact the new program will have on other USHE institutions. Describe any discussions with other institutions pertaining to this program. Include any collaborative efforts that may have been proposed.

Where possible, some courses in the program will be delivered (or be available) outside the University of Utah's designated service area of Salt Lake and Summit (Park City) counties. to provide opportunities to professionals who are work in remote locations associated with the mining industry. Instruction and courses will originate from the University of Utah's main campus and incorporate established technologies available through University of Utah's Learning Management System, Canvas.

The University of Utah is the only USHE school offering graduate education in mining engineering and degrees following the Professional Science Master's model. The Mining Program at Utah State University Eastern only provides undergraduate, non-credit training. There are no expected impacts to other USHE institutions and no collaborative efforts have been proposed given the program's focus.

External Review and Accreditation

Indicate whether external consultants or, for a career and technical education program, program advisory committee were involved in the development of the proposed program. List the members of the external consultants or advisory committee and briefly describe their activities. If the program will seek special professional accreditation, project anticipated costs and a date for accreditation review.

The University of Utah Professional Master of Science and Technology has been affiliated with the Professional Science Master's National Office since 2001.

The national office implements a peer-review, external review committee process to ensure that the guidelines are met and affiliated programs maintain professional standards. This quality assurance mechanism is sustained by a revolving group of volunteer experts. Reviewers are PSM program directors, industry representatives, and PSM administrators. If you have any questions regarding the affiliation, please contact PSM National Office.

The College of Mines and Earth Sciences has instituted a comprehensive and systematic learning assessment program for its undergraduate engineering programs. These regular assessments contribute to the continuous improvement required for accreditation by ABET. The College plans to extend this program to its graduate degrees, and the PMST degree in the Earth Resource Management track can be included in that expansion.

Section IV: Program Details

Graduation Standards and Number of Credits

Provide graduation standards. Provide justification if number of credit or clock hours exceeds credit limit for this program type described in R401-3.11, which can be found at higheredutah.org/policies/R401.

The Professional Master of Science and Technology Program consists of four parts, totaling 36 credit hours. Core Science courses are defined based on the focus area chosen (15-16 credits); courses that develop Advanced Quantitative Skills and Transferable (Business) Skills complete the required course work. The program incorporates a Professional Experience Project (3 credits as an internship project) for students to demonstrate their knowledge and skills.

Admission Requirements

List admission requirements specific to the proposed program.

Students applying to the PMST program must meet the minimum admission requirements of The Graduate School:

1. An undergraduate GPA of at least 3.0, based on all undergraduate work. If the undergraduate GPA is below 3.0, a GPA will be calculated on the last 60 semester hours (90 quarter hours) of the undergraduate work; a GPA of at least 3.0, based on this calculation, will be used for admission consideration;
2. A bachelor's degree from a regionally accredited college or university;
3. Receiving a recommendation from the PMST Executive Committee for admission to the graduate program.

Curriculum and Degree Map

Use the tables in Appendix A to provide a list of courses and Appendix B to provide a program Degree Map, also referred to as a graduation plan.

Section V: Institution, Faculty, and Staff Support

Institutional Readiness

How do existing administrative structures support the proposed program? Identify new organizational structures that may be needed to deliver the program. Will the proposed program impact the delivery of undergraduate and/or lower-division education? If yes, how?

The Earth Resource Management track in the PMST program will require no additional institutional support, nor will it require additional physical facilities.

The Earth Resource Management track will require the development of two new graduate courses in Mining Engineering: MG EN 6340, Resource Economics and Valuation, and MG EN 6010, Mineral Extraction and Processing. Both courses are intended for those in the ERM track who require more familiarity with the mineral resources industry. Both courses will use some material from upper division undergraduate courses currently offered by the Mining Engineering Department, with additional material related to the advanced management and business concepts included in the PMST degree. These courses will be developed by members of the Mining Engineering Department faculty.

Faculty

Describe faculty development activities that will support this program. Will existing faculty/instructors, including teaching/graduate assistants, be sufficient to instruct the program or will additional faculty be recruited? If needed, provide plans and resources to secure qualified faculty. Use Appendix C to provide detail on faculty profiles and new hires.

Mining engineering courses will be taught by members of the regular faculty of the Mining Engineering Department.

Michael G. Nelson, Ph.D., Professor and Department Chair
MG EN 6350 Safety & Health Management
MG EN 6010 Mining Methods and Practices

W. Pratt Rogers, Ph.D., Assistant Professor
MG EN 6370 Data Management in Engineering & Heavy Industry
MG EN 6015 Mine Visits

Jessica M. Wempfen, Ph.D., Assistant Professor
MG EN 6340 Resource Economics and Valuation

Mary Ann Wright, M.S. Biology, Adjunct Associate Professor
MG EN 6080 Mine Permitting and Reclamation

The PMST program employs five associate instructors to teach the transferable skills courses specific to their background:

Jodie H. Jones, M.A.
MST 6010 – Communication

Michael Keene, Ph.D.
MST 6023 – Entrepreneurship and New Product Development

Alan Lindsay, M.A.
MST 6020 – Effective Leadership and Management

Shad Slaughter, M.B.A.
MST 6021 – Strategy and Marketing
MST 6020 – Operations Management

Bryant Weber, B.S. Accounting
MST – 6012 Accounting and Finance

One faculty member is a Lecture with the Department of Philosophy; the PMST program transfers funds to the Department of Philosophy to cover the teaching of this course.

Landon McBrayer, Ph.D.
MST 6500 – Scientific Reasoning and Inquiry

The program director currently teaches two courses:

Ray Hoobler, Ph.D.
MST 6021 – Strategy and Marketing
MST 6600 – Applied Statistical Techniques

Staff

Describe the staff development activities that will support this program. Will existing staff such as administrative, secretarial/ clerical, laboratory aides, advisors, be sufficient to support the program or will additional staff need to be hired? Provide plans and resources to secure qualified staff, as needed.

Mining Engineering Staff

The Mining Engineering Department presently has one full-time staff member. It is expected that another staff member will be transferred to the Department elsewhere in the College of Mines and Earth Sciences during the 2017-18 academic year. The new staff member will assist with administration of the PMST in Earth Resource Management

PMST Program Director

The Program Director is a full-time staff position. The University Job Title for the position is Education Director.

PMST Project Coordinator

The Project Coordinator is a full-time staff position funded by student program fees. The

Program Coordinator reports directly to the Program Director

Student Advisement

Describe how students in the proposed program will be advised.

First Year Advising

Track Directors, the Program Director, and the Program Coordinator provide guidance to students in the PMST program during their first year. The focus should be on completion of the MST courses with their cohort and completion of one or more core science courses. The Program Director and Program Coordinator will be the principle contact for First Year Advising. The Program Director and Project Coordinator will publish a process for first review in the PMST Handbook.

Advising After the First Year

After completing their first year, students meet with their Track Director, Supervisory Committee Chair, or the Program Director and document their intended plan of study. After this meeting, students submit an updated curriculum worksheet to the Project Coordinator for review and filing with the student's record.

Library and Information Resources

Describe library resources required to offer the proposed program if any. List new library resources to be acquired.

No additional library resources are needed.

Projected Enrollment and Finance

Use Appendix D to provide projected enrollment and information on related operating expenses and funding sources.

Section VI: Program Evaluation

Program Assessment

Identify program goals. Describe the system of assessment to be used to evaluate and develop the program.

The Earth Resource Management track will be administered by the PMST program's executive committee in collaboration with the department of Mining Engineering; assessment of the Earth Resource Management track will be incorporated into the PMST review and assessment cycle. The PMST program's graduate degree programs are reviewed every seven years by the University of Utah's Graduate Council with the most recent assessment in 2014–2015.

Members of the PMST executive committee include: The program director, dean of the Graduate School, and one or more-track directors representing the individual degree programs. If approved, a sixth track director from the department of Mining Engineering representing the Earth Resource Management track will be added to the executive committee.

The PMST executive committee evaluates the success and effectiveness of the PMST program and the PMST courses. The PMST executive committee has reviewed and approved the

proposed track and program of study.

Changes to PMST courses (listed under MST in the general catalog) and PMST degree programs are reviewed by the PMST program's executive committee. The general process:

1. Proposed changes are documented and submitted by a member of the executive committee to the to all members for review. documentation includes:
 - a. learning objectives associated with the course
 - b. description indicating how the change supports the PMST program objectives.
2. the executive committee reviews the proposed changes and will approve, not approve, or request additional information regarding the change.
3. If approved, the program director works with Curriculum Administration to formally make the curriculum change following the university's procedures.

Learning outcomes for the PMST program are established by the PMST executive committee and published by the Office of Learning Outcomes Assessment:
(<http://learningoutcomes.utah.edu/int-degree/13>)

Student Standards of Performance

List the standards, competencies, and marketable skills students will have achieved at the time of graduation. How and why were these standards and competencies chosen? Include formative and summative assessment measures to be used to determine student learning outcomes.

Students in the Earth Resource Management track will be expected to meet the performance standards of the University of Utah's Graduate School, as related to participation in courses and grades received.

Appendix A: Program Curriculum

List all courses, including new courses, to be offered in the proposed program by prefix, number, title, and credit hours (or credit equivalences). Indicate new courses with an X in the appropriate columns. The total number of credit hours should reflect the number of credits required to be awarded the degree.

For variable credits, please enter the minimum value in the table for credit hours. To explain variable credit in detail as well as any additional information, use the narrative box at the end of this appendix.

Course Number	NEW Course	Course Title	Credit Hours
General Education Courses (list specific courses if recommended for this program on Degree Map)			
General Education Credit Hour Sub-Total			
Required Courses			
MG EN 6340	×	Resource Economics and Valuation	3
MG EN 6010	×	Mineral Extraction and Processing	3
MG EN 6370		Data Management in Engineering & Heavy Industry	3
MST 6010		Effective Communication	1
MST 6012		Accounting and Finance	1
MST 6020		Leadership and Management	1
MST 6021		Strategic Planning and Marketing	1
MST 6022		Production and Operations Management	1
MST 6500		Scientific Reasoning and Inquiry	3
MST 6600		Advanced Statistical Techniques	3
MST 6975		Professional Experience Project	3
Required Course Credit Hour Sub-Total			23
Elective Courses			
MG EN 6080		Mine Permitting and Reclamation (to be co-listed with existing UG course)	3
MG EN 6015		Mine Visits (to be co-listed with existing UG course)	1
MG EN 6350		Safety & Health Management (to be co-listed with existing UG course)	3
		Non-STEM Elective	3
		Transferable Skill Elective	3
Elective Credit Hour Sub-Total			13
Core Curriculum Credit Hour Sub-Total			36

Program Curriculum Narrative

Describe any variable credits. You may also include additional curriculum information.

The following three components are required for affiliation with the Professional Science Master's (PSM) organization (<https://www.professionalsciencemasters.org/affiliation/guidelines>):

1. a majority of the course content in the natural sciences, technology, engineering, mathematics and/or computational sciences.
2. a professional skills component must be developed in consultation with leaders from the targeted industry, business, government, or non-profit organizations; and
3. an experiential component that must include at least one capstone project, supervised collaboratively by faculty and employers, evaluated or graded by faculty and typically developed with an employer(s), which integrates the practical application of scientific and professional knowledge, behavior, and skills. The experiential component typically includes a structured internship and provides an opportunity for students to demonstrate proficiency in written and oral communication skills.

The PMST degree requires 36 credit hours of graduate level course work. PMST curriculum are divided into four topic areas:

- Graduate science courses (15 credit hours)
- Advanced Quantitative Skills (6 credit hours; MST 6600 and an elective)
- Transferable Skills (12 credit hours; MST courses and an elective)
- Professional Experience Project, Internship (3 credit hours)

In order to meet the program's STEM requirements, students can take no more than 6 credit hours of low or non-STEM subjects. (12 credit hours of Transferable Skills plus 6 credit hours of low-STEM electives.) This assumes students complete the minimum program requirement of 36 credit hours.

Degree Map

Degree maps pertain to undergraduate programs ONLY. Provide a degree map for proposed program. Degree Maps were approved by the State Board of Regents on July 17, 2014 as a degree completion measure. Degree maps or graduation plans are a suggested semester-by-semester class schedule that includes prefix, number, title, and semester hours. For more details see <http://higheredutah.org/pdf/agendas/201407/TAB%20A%202014-7-18.pdf> (Item #3).

Please cut-and-paste the degree map or manually enter the degree map in the table below.

Full-time

First Year - Fall Semester

Aug Sep Oct Nov Dec

MST 6010 MST 6012 MST 6020

MST 6500 - Scientific Reasoning

" MG EN 6340 Resource Economics and Valuation

First Year -Spring Semester

Jan Feb Mar Apr May

MST 6022 22) MST 6021 23) MST 6023

MST 6600 - Applied Statistical Techniques

MG EN 6010 Mineral Extraction and Processing

Second Year - Fall Semester

Aug Sep Oct Nov Dec

MG EN 6370 Data Management in Engineering & Heavy Industry

Elective (Track Specific)

Elective (Track Specific)

Second Year - Spring Semester

Jan Feb Mar Apr May

Elective (Track Specific)

Elective (Track Specific)

Professional Experience Project (Internship)

Part-time

First Year - Fall Semester

Aug Sep Oct Nov Dec

MST 6010 MST 6012 MST 6020

MST 6500 - Scientific Reasoning (AQS)

First Year - Spring Semester

Jan Feb Mar Apr May

MST 6022 MST 6021 MST 6023

MST 6600 - Applied Statistical Techniques

Second Year - Fall Semester

Aug Sep Oct Nov Dec

MG EN 6370 Data Management in Engineering & Heavy Industry)

MG EN 6340 Resource Economics and Valuation

Second Year - Spring Semester

Jan Feb Mar Apr May
MG EN 6010 Mining Methods and Practices
Elective (Track Specific)

Third Year - Fall Semester
Aug Sep Oct Nov Dec
Elective (Track Specific)
Elective (Track Specific)

Third Year - Spring Semester
Jan Feb Mar Apr May
Elective (Track Specific)
Professional Experience Project (Internship)

Appendix C: Current and New Faculty / Staff Information

Part I. Department Faculty / Staff

Identify # of department faculty / staff (headcount) for the year preceding implementation of proposed program.

	# Tenured	# Tenure -Track	# Non -Tenure Track	
Faculty: Full Time with Doctorate	2	3		
Faculty: Part Time with Doctorate			7	
Faculty: Full Time with Masters		3	1	
Faculty: Part Time with Masters			1	
Faculty: Full Time with Baccalaureate			1	
Faculty: Part Time with Baccalaureate			1	
Teaching / Graduate Assistants	/ / / / /	/ / / / /		
Staff: Full Time			1	
Staff: Part Time				

Part II. Proposed Program Faculty Profiles

List current faculty within the institution -- with academic qualifications -- to be used in support of the proposed program(s).

	First Name	Last Name	Tenure (T) / Tenure Track (TT) / Other	Degree	Institution where Credential was Earned	Est. % of time faculty member will dedicate to proposed program.	If "Other," describe
Full Time Faculty							
	Felipe	Calizaya	T	PHD	Colorado School of Mines		
	Jeffrey Craig	Johnson	TT	PHD	University of Utah		
	Michael G	Nelson	T	PHD	University of West Virginia		
	William Pratt	Rogers	TT	PHD	University of Arizona		
	Jessica Michelle	Wempen	TT	PHD	University of Utah		
	Louie	Cononelos	Other	MA	University of Utah		Career
	Thomas Alexander	Hethmon	Other	MS	California State University Northridge		Career
	Randy	Nelsen	Other	BS			Career
	Mary Ann	Wright	Other	MS	Indiana University Bloomington		Career
Part Time Faculty							
	Eduardo Alejandro	Cordova	Other	PHD	University of Utah	0	Adjunct
	James	Donovan	Other	PHD	Virginia Polytechnic Institute	0	Adjunct
	Jeff	Mckenzie	Other	MBA	University of Utah	0	Adjunct
	Dale	Preece	Other	PHD	University of New Mexico	0	Adjunct
	Abani Ranjan	Samal	Other	PHD		0	Adjunct
	Krishna	Sinha	Other	PHD	University of Minnesota Twin Cities	0	Adjunct
	Duane L	Whiting	Other	BS	University of Utah	0	Adjunct
	Jeffrey	Whyatt	Other	PhD	University of Minnesota Twin Cities	0	Adjunct
	Zavis	Zavodni	Other	PHD	University of Arizona	0	Adjunct

	First Name	Last Name	Tenure (T) / Tenure Track (TT) / Other	Degree	Institution where Credential was Earned	Est. % of time faculty member will dedicate to proposed program.	If "Other," describe

Part III: New Faculty / Staff Projections for Proposed Program

Indicate the number of faculty / staff to be hired in the first three years of the program, if applicable. Include additional cost for these faculty / staff members in Appendix D.

	# Tenured	# Tenure -Track	# Non -Tenure Track	Academic or Industry Credentials Needed	Est. % of time to be dedicated to proposed program.
Faculty: Full Time with Doctorate					
Faculty: Part Time with Doctorate					
Faculty: Full Time with Masters					
Faculty: Part Time with Masters					
Faculty: Full Time with Baccalaureate					
Faculty: Part Time with Baccalaureate					
Teaching / Graduate Assistants					
Staff: Full Time					
Staff: Part Time					

Appendix D: Projected Program Participation and Finance

Part I.

Project the number of students who will be attracted to the proposed program as well as increased expenses, if any. Include new faculty & staff as described in Appendix C.

Three Year Projection: Program Participation and Department Budget						
	Year Preceding Implementation	New Program				
		Year 1	Year 2	Year 3	Year 4	Year 5
Student Data						
# of Majors in Department	45	50	57	67	73	76
# of Majors in Proposed Program(s)	////	7	11	14	15	16
# of Graduates from Department	15	15	15	15	16	16
# Graduates in New Program(s)	////	0	4	5	6	6
Department Financial Data						
	Department Budget					
		Year 1	Year 2	Year 3		
	Year Preceding Implementation (Base Budget)	Addition to Base Budget for New Program(s)	Addition to Base Budget for New Program(s)	Addition to Base Budget for New Program(s)		
<i>Project additional expenses associated with offering new program(s). Account for New Faculty as stated in Appendix C, "Faculty Projections."</i>						
EXPENSES – nature of additional costs required for proposed program(s)						
<i>List salary benefits for additional faculty/staff each year the positions will be filled. For example, if hiring faculty in year 2, include expense in years 2 and 3. List one-time operating expenses only in the year expended.</i>						
Personnel (Faculty & Staff Salary & Benefits)	\$255,000	\$63,000	\$63,000	\$53,000		
Operating Expenses (equipment, travel, resources)	\$41,400					
Other:						
TOTAL PROGRAM EXPENSES	////	\$63,000	\$63,000	\$53,000		
TOTAL EXPENSES	\$296,400	\$359,400	\$359,400	\$349,400		
FUNDING – source of funding to cover additional costs generated by proposed program(s)						
<i>Describe internal reallocation using Narrative 1 on the following page. Describe new sources of funding using Narrative 2.</i>						
Internal Reallocation		\$63,000	\$63,000	\$53,000		
Appropriation	\$211,000					
Special Legislative Appropriation						
Grants and Contracts						
Special Fees	\$51,700	\$8,050	\$12,650	\$16,100		
Tuition						
Differential Tuition (requires Regents approval)						
PROPOSED PROGRAM FUNDING	////	\$71,050	\$75,650	\$69,100		
TOTAL DEPARTMENT FUNDING	\$262,700	\$333,750	\$338,350	\$331,800		
Difference						
Funding - Expense	(\$33,700)	(\$25,650)	(\$21,050)	(\$17,600)		

Part II: Expense explanation

Expense Narrative

Describe expenses associated with the proposed program.

The PMST program currently meets operational cost using reserve funds. Reserve funds are projected to cover operational costs through the fiscal year 2020.

Current expenses

The PMST program is funded through three accounts:

1. Payroll and benefit base funding. These funds cover salaries for the Program Director and Track Directors. Each year, we transfer Track Director salaries to their individual departments for disbursement.
2. Payroll and benefit base funding to cover Associate Instructor salaries. (Approximately \$30,000 per year)
3. A Student Fee of \$575 per student per semester. This fee is primarily used to cover Project Coordinator wages and benefits. A small fraction of funds is used to cover incidental expenses for student events.

New Expenses

Addition of the Earth Resource Management Track are expected to add the following costs:

1. Payroll and benefit funding to cover the cost of the Earth Resource Management track director. (\$10,000 per year)
2. Payroll and benefit funding to add MST course sections. (Approximately \$23,000 per year based on current expenses.)
3. Payroll and benefit funding to develop hybrid courses that will be targeted towards Earth Resource Management students. (Estimated \$20,000 per year; four courses at \$5,000 per course.)

The department of Mining Engineering will cover new expenses for three years to establish the new degree.

Part III: Describe funding sources

Revenue Narrative 1

Describe what internal reallocations, if applicable, are available and any impact to existing programs or services.

The department of Mining Engineering will allocate funds from department incentive funds and request funding be allocated by the College of Mines and Earth Sciences to the department of Mining Engineering from the Utah School and Institutional Trust Fund.

The PMST program has maintained 40 to 50 students in the program who take, on average, six credit hours per term with a resulting revenue in tuition and fees of \$250k per year (45 students); an additional \$50k of revenue is generated from the Special Program Fee of \$575 per student per year. As stated above, the Special Program Fee funds the Project Coordinator position.

An additional five students to the program would increase revenue from tuition and fees by \$28k and increase revenue from the Special Program Fee by over \$5k. An increase of ten students to the program would, of course, double these estimates.

Revenue Narrative 2

Describe new funding sources and plans to acquire the funds.

No new funding sources are planned.

March 8, 2018

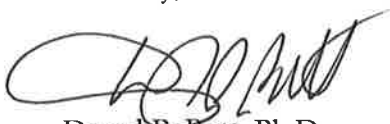
David B. Kieda, Dean
The Graduate School
CAMPUS

Dear Dean Kieda:

I am writing to affirm my full support for the proposed new "Earth Resource Management" track in the Professional Management of Science and Technology program that is administered by the Graduate School. The concept for this degree was developed in response to recommendations from industry contacts and our Advisory Committee to the Mining Engineering Department. Dr. Nelson and others in our college have been working on the development of a curriculum for the past 18 months that responds to input from these stakeholders. I see this as an interdisciplinary degree that has great potential for growth and inclusion of other colleges as it evolves.

As the demand on the earth's resources increases, and the need for sustainable use of those resources becomes more and more important, the knowledge and skills that this degree will provide to its graduates will be of great value. I am confident that enrollment in the degree will be steady, and that its graduates will represent the University of Utah very well. Please let me know if you would like to discuss this proposed program further.

Sincerely,



Darryl P. Butt, Ph.D.
Dean, College of Mines and Earth Sciences

Cc: Dr. Michael Nelson, chair, Mining Engineering
Dr. Sivaraman Guruswamy, associate dean; professor, Metallurgical Engineering



March 11, 2018

Dr. Ray Hoobler
Director, PMST Program
University of Utah
Building 44 Room 223
Salt Lake City, UT 84112

Re: Letter of endorsement for the addition of an Environmental Resource Management (ERM) Track to the PMST degree program

Dear Ray-

I am writing this letter to document my enthusiastic endorsement of the proposed Environmental Resource Management (ERM) Track in the PMST degree program. The proposed ERM track provides Master's level training in the science and technology of resource management and utilizations, and incorporates important broader skills in finance, management, leadership, law, and innovation. The proposed track will also directly address a critical workforce development need that is strongly relevant to industry and business in Utah, as well as the larger Intermountain West. The integrated broader skills and Professional Engineering Project (Internship) clearly differentiate this proposed PMST degree track from the traditional research-intensive MS degree programs currently offered in the intermountain region.

The PMST degree program is administratively housed in the Graduate School, and so my letter of endorsement guarantees that the Graduate School will assist the PMST in the creation and ongoing stewardship of the ERM track of the PMST program. The Graduate School will also work with University administration to provide necessary resources to ensure the long-term financial sustainability of this program. We look forward to ensuring the success of this important new track within the existing PMST program.

Best Regards,

David Kieda
Dean, The Graduate School

**The Graduate School
302 Park Building**

201 South Presidents Circle
Salt Lake City, Utah 84112-9016
(801) 581-7642 · FAX (801) 585-6749
www.utah.edu/gradschool/

March 12, 2018

Dear Graduate Council,

The Department of Mining Engineering and the Professional Master of Science and Technology (PMST) program are asking approval to start a new emphasis (track) within the PMST program: Earth Resource Management.

The attached proposal describes the rationale for the new emphasis, a description the new track, how it fits within the current PMST program as well as details regarding the support of the new offering. The new track would begin Fall 2018.

Working with Mike Nelson, chair of the Department of Mining Engineering, the new track will follow the Professional Science Master's (PSM) model that incorporates rigorous graduate coursework in both the STEM focus area and business—operations, finance, communication, regulatory functions, etc. The Earth Resource Management track will be implemented within the existing PMST framework. The University of Utah's PMST program is reviewed by the Commission on Affiliation of PSM Programs every five years and was successfully evaluated Fall 2015.

The PMST program currently includes four tracks: Biotechnology, Computational and Data Science, Environmental Science, and Science Instrumentation. The College of Mines and Earth Science awards degrees for students completing the Environmental Science Track with the three other track's degrees awarded by the College of Science.

The College of Mines and Earth Science has supported over 90 graduates from the Environmental Science track; I look forward the opportunity to extend our interdisciplinary program with the Department of Mining Engineering.

Sincerely yours,



Ray J. Hoobler
Director, Professional Master of Science and Technology
(801) 585-5630
ray.hoobler@utah.edu

March 8, 2018

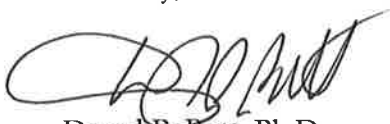
David B. Kieda, Dean
The Graduate School
CAMPUS

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Sincerely,



Darryl P. Butt, Ph.D.
Dean, College of Mines and Earth Sciences

Cc: Dr. Michael Nelson, chair, Mining Engineering
Dr. Sivaraman Guruswamy, associate dean; professor, Metallurgical Engineering