

The University Senate of Michigan Technological University

PROPOSAL 21-04

SUSPENSION OF THE BS DEGREE IN MINING ENGINEERING

The Senate acknowledges that, due to loss of mining engineering faculty through non-rehiring of vacant positions, informal transfer of tenured mining faculty to other departments, and termination of a non-tenured mining faculty, the University is no longer able to offer a Bachelor of Science program in Mining Engineering. The Senate notes that no students have been admitted into this program since September of 2003, and that no mining engineering courses have been scheduled for the next academic year. It is with profound regret that the Senate therefore approves the administration's recommendation for suspension of this program.

Michigan State Legislature Public Act 70, 1885 (the "University Charter") directs Michigan Tech to provide the inhabitants of this state with the means of acquiring a "thorough knowledge of the mineral industry in its various phases." Although this phrase does not specifically mandate the offering of a Mining Engineering program by the University, future compliance with Public Act 70 requires an understanding of what "thorough knowledge" means, what a "mineral industry" is and, what the "phases" of that industry are.

It is the position of the Senate that the phrase "thorough knowledge" in Public Act 70 means a Bachelors degree program at a minimum.

It is the position of the Senate that programs related to the so-called aggregate industry, or any other non-mineral industry, do not satisfy the "mineral industry" requirement of Public Act 70.

It is the position of the Senate that continued compliance with Public Act 70 by the University is conditional upon the survival of the remaining mineral industry programs; specifically the BS programs in Geology, in Applied Geophysics, and in Geological Engineering.

The Senate has made the above determinations based upon the discussions that follow.

Meaning of the Phrase "thorough knowledge"

At the time Public Act 70 was enacted, no Minor program existed at Michigan Tech, thus the phrase "thorough knowledge" indicates the Bachelors degree at a minimum. At present, the Bachelors degree is the usual entry-level requirement for professional employment within the mineral industry, and its sub-industries. The holding of a Minor degree alone is not considered to be a condition for professional employment.

Meaning of the phrase "mineral industry"

The definitions that follow are based upon common usage in the mining industry as well as the recently developed North American Industrial Classification System (NAICS). The NAICS system has been developed by the U. S. Census Bureau, and replaces the older Standard Industrial Classification (SIC) system.

Mining industries are those that extract resources from the earth's crust. *Mining Industries* are divided into two main divisions, *Mineral Mining Industries* and *Non-mineral Mining Industries*, based on the type of natural resource being utilized, and the nature of the product. *Mineral Mining Industries* are usually referred to simply as *Mineral Industries*. It is the *Mineral Mining Industry* that is referenced in Public Act 70.

Mineral Mining Industries are those that extract "inorganic, naturally occurring, crystalline solids with a definite chemical composition". The products of these industries also have specific chemical compositions, which determine their ultimate use in manufacturing industries. *Mineral Mining Industries* are further divided into, *Metallic Mineral Mining*, and *Non-metallic Mineral Mining* as shown in Tables 1 and 2. *Non-metallic Mineral Mining Industries* are sometimes referred to as "Industrial Minerals".

Table 1: Metallic Mineral Mining Industries

NAICS code	NAICS Industry title
212210	Iron Ore Mining
212221	Gold Ore Mining
212222	Silver Ore Mining
212231	Lead Ore and Zinc Ore Mining
212234	Copper Ore and Nickel Ore Mining
212291	Uranium-Radium-Vanadium Ore Mining
212299	All Other Metal Ore Mining

Table 2: Non-metallic Mineral Mining Industries

NAICS code	NAICS Industry title
212324	Kaolin and Ball Clay Mining
212325	Clay and Ceramic Refractory Minerals Mining
212391	Potash, Soda, and Borate Mineral Mining
212392	Phosphate Rock Mining
212393	Other Chemical and Fertilizer Mining
212399	All Other Nonmetallic Mineral Mining

Non-mineral Mining Industries are those that extract natural resources from the earth's crust that are organic in origin, or non-crystalline, or of no specific chemical composition. Non-mineral groups are shown in Table 3. Coal Mining is classified as a non-mineral mining industry because coal is organic. The remaining industries of the group consist of dimension stone producers, and natural aggregate producers. These industries are not the mineral industries referenced in Public Act 70.

Aggregate industries are those that produce crushed, broken or screened materials. These materials can be produced by mining sand, gravel, or crushed rock, or collected as a by-product of non-mining industries as in the case of blast and steel furnace slag. Quoting the Michigan Aggregate Association, "A large number of aggregate mines are family owned and operated. 80% of aggregate plants operate with 20 employees or less". Production from these small sand and gravel pits dominates the aggregate industry in Michigan, accounting for nearly twice the production from crushed stone quarries, and many times that from non-mining sources.

There have been suggestions that a program in the aggregate industry might satisfy the conditions in Public Act 70. Aggregates are non-minerals, so this cannot be the case. Furthermore there is little need for college-educated mining or geology professionals in the sand and gravel business, or in crushed rock operations, with the possible exception of large limestone quarries operated by the cement industry.

Table 3: Non-mineral Mining Industry Groups

NAICS code	NAICS Industry Title
212111	Bituminous Coal and Lignite Surface Mining
212112	Bituminous Coal Underground Mining
212113	Anthracite Mining
212311	Dimension Stone Mining and Quarrying
212312	Crushed and Broken Limestone Mining and Quarrying
212313	Crushed and Broken Granite Mining and Quarrying
212319	Other Crushed and Broken Stone Mining and Quarrying
212321	Construction Sand and Gravel Mining
212322	Industrial Sand Mining

Meaning of the phrase "phases of the mineral industry"

The "phases" of the mineral industry are activities that involve not only the production of mineral ores, but also the location and the processing of those ores. Non-mineral industries (such as sand and gravel operations) are not phases of the mineral industry. Phases of the mineral industry include:

1. mineral exploration and prospect evaluation,
2. mine planning and development,
3. all aspects of open pit and underground mine operations,
4. on-site processing and beneficiation of mined minerals.

Bachelors degree programs at Michigan Tech have covered all of these phases for many decades, as shown in Table 4.

Table 4: Mineral Mining Bachelors Programs at MTU

	Geology	Geol. Engrg.	Geophysics	Mining Engrg.	Min. Proc. Engrg.
Phase 1 - exploration	++	++	++	-	-
Phase 2 - development	+	+	-	++	-
Phase 3 - operations	-	-	-	+++	-
Phase 4 - beneficiation	-	-	-	+	+++

The loss of the BS in Mineral Processing Option and BS in Mining Engineering will substantially decrease, but not eliminate, the University's ability to fulfill its obligations under Public Act 70. Continued compliance will, however, depend on the survival of the remaining mineral industry programs; specifically the BS programs in Geology, in Applied Geophysics and in Geological Engineering, which cover phases 1 and 2 of the mineral industry as shown in Table 4.

Adopted by Senate: 25 February 2004

Approved by President: 3 March 2004