

August 11, 2015

Charge

Review institutional support of its teaching mission and support toward its graduate programs in the form of teaching assistantships (TA) and make recommendations to the Executive Team related to future directions of this support. If recommending increased support, provide guidance as to where additional support may be generated and/or prioritize the importance of this support in relationship to other College/Departmental needs.

Relationship to Strategic Plan

Goal 1 – Enhance distinctive identity and reputation of Mines

- Create new and enhance existing large research initiatives focused on the global challenges related to the earth, energy and environment.

Goal 2 – Build upon a student-centered campus culture of excellence, inclusion, diversity and community

- Enhance opportunities for students to develop effective communication skills as a complement to strong content expertise

Goal 3 – Build and diversify revenue streams and auxiliary enterprises

- Establish new or expand continuing education and executive education enterprises that enhance the reputation, global reach and financial security of Mines.
- Diversify federal research funding across multiple agencies while increasing corporate and private research support.

Membership

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Context

Current institutional investments (FY15) in the form of instructional support directed toward students and graduate fellowship support not directly tied to instruction are:

- Graduate Teaching Assistantships - \$4.6M
- Student Hourly Support - \$0.67M
- First-Year PhD Fellowships - \$0.68M
- Differential Tuition Support - \$4.4M
- Summer Tuition Fellowship Support - \$1.7M

Analyses of peer benchmarking data and the institutional history of teaching assistantship (TAs) budgets are provided as part of the attached document.

Using AY14 data, Mines reported to ASEE 154 TAs total. Based on metrics derived from all institutions reporting to ASEE, for engineering programs the size of Mines, one would expect the number of TAs to be about 223. There is, however, a significant deviation in the prediction based on total institution size. If one considers only smaller institutions (total enrollment < 16,000), one would predict that Mines should support about 141 TAs. While Mines actually appears to provide TAs appropriate to its overall size, many faculty and staff – for whom peer departments lie in larger institutions, or for whom are in programs that traditionally

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provide higher-levels of TA support than typical engineering units (e.g., CH) – perceive Mines under supports its Teaching Assistant obligations.

As defined by institutional policy, Teaching Assistantships are awarded to graduate students to assist in the education of other students, either undergraduate or graduate, by teaching, tutoring, instructing or lecturing in laboratories or recitations under the direction of a faculty member. Teaching Assistants are not assigned full responsibility for teaching courses; rather they assist faculty members in course instruction. Teaching Assistantships are supported by CSM as part of its overall instructional budget.

Within this role, the cost of using TAs to provide instructional support is relatively high. On an academic year basis, the cost of hiring one TA is about \$33k/year. To put this cost into context, this cost is a significant fraction of the cost of hiring an additional instructional faculty member. The cost of supporting TAs, coupled with institutional limitations both on the number of hours graduate students may be employed and limitations on the instructional roles they may fill, mean that from an instructional delivery standpoint, TAs are not a cost effective solution to providing instructional support.

The need for instructional support to line faculty, however, will continue to rise. As Mines moves toward a model of incorporating more active learning into its curriculum, there will be increasing needs to provide additional instructional support. Continuing to attempt to scale instructional support via increasing the number of TAs will be cost prohibitive.

Finally, while TAs are rationalized and budgeted as a part of the instructional cost of the institution, they are also used – particularly with our current limitations in First-Year PhD Fellowship budget – to provide a mechanism for research-active programs to recruit high-quality graduate students and, in this role, they provide direct support to the research enterprise. This additional rationalization for the allocation and deployment of TA budget complicates decisions related to the appropriate number, use and deployment of TAs across campus.

Recommendations

Synopsis: We propose breaking the connection between providing graduate financial aid aimed at supporting our research enterprise and the need to provide cost-effective instructional support. Rather than relying on graduate TAs to provide instructional support, we propose moving to a model where undergraduate and graduate hourly employees provide primary instruction support. Graduate financial aid would be retained and would be provided in the form of generic graduate assistantships that are acknowledged by, and directly coupled to, the graduate research enterprise.

Details: Consider the following assumptions and model:

- Within the current funding context, total funding available to support

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instructional delivery and graduate assistantships is the sum of the existing TA, First-Year Fellowship, and Student Hourly budgets. Total available is \$5.95M.

- We recommend retention of the existing Differential Tuition and Summer Tuition Fellowship programs to support required registration in the summer and the difference between non-resident and resident tuition for graduate students supported as full-time graduate assistants.
- We recommend that the primary instructional support be provided by student hourly employees, mostly undergraduate students, but supplemented with graduate students where necessary. If each undergraduate hourly student is limited to working 5 h/wk at \$15/h, the total annual cost per hourly employee is \$2,400. Graduate employees could work up to 20 h/wk at the same hourly rate, but would do so as hourly employees. This employment contract would be outside of any additional financial aid they may receive.
- If existing graduate TAs provide, on average, 15 h/wk instructional support across the different departments, then the 154 TAs employed in Fall 2014 provided 2,310 h/wk of instructional support through a revised program to provide the same level of support that is currently provided. Assuming half of this support could be provided by undergraduate students working 5 h/wk and the remaining provided by graduate students working 20 h/wk, under the proposed program, we would need to employ 231 undergraduate students and 58 graduate students to deliver our instructional support. Total cost of this support would be \$1.1M – compared to the current TA cost of \$4.6M.
- If we fully fund an instructional hourly budget at \$1.1M from the existing \$5.95M, there would be \$4.87M remaining in this budget that could be used as financial aid to support generic graduate assistants. At a cost of \$33k per graduate assistant, the existing budget would support about 148 graduate assistants. This compares to about 175 TA and First-Year Fellowship awards currently supported.
- Base the size and distribution of the graduate assistant budget on the number of research-active graduate students. As a strawman, target one graduate assistant position for every three externally supported, research-based graduate students, and one graduate assistant position for every six self-supported, research-based (PhD and Thesis Masters) graduate students.
- Based on Fall 2014 enrollment, full implementation of the assistantship assignments defined above would require budget to support 202 graduate assistants. These assistantships would be distributed among departments as

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given in the table below and would require an additional budget increment of \$1.7M.

Model - Graduate Assistant (GA) Allocation

	Research Supported		Self Supported		Total Target GAs	Available With Current Budget
	External RAs	Institutional GAs	Other Thesis Students	Institutional GAs		
Applied Math & Statistics	2	1	29	4	5	4
Chemical & Biological Engineer	48	16	31	4	20	15
Chemistry	27	9	34	4	13	10
Civil & Environmental Engineer	34	11	44	6	17	12
Economics and Business	9	3	25	3	6	4
Electrical Enginrg & Comp Sci	13	4	43	5	9	7
Geology	41	14	110	14	28	21
Geophysics	52	17	27	3	20	15
Mechanical Engineering	33	11	45	6	17	12
Metallurgical & Materials Eng	67	22	44	6	28	21
Mining	6	2	16	2	4	3
Petroleum	39	13	45	6	19	14
Physics	34	11	37	5	16	12
Total	405	134	530	68	202	150

Also include (purple column) is the distribution of graduate assistants available without the \$1.7M budget increment. If we were to implement this model today, this shows the size and distribution of graduate assistants that would be available without additional budget actions.

Issues: The committee identified the following items as additional considerations needing further discussion.

- The number of students providing instructional support in this model is a factor of two larger than is currently being utilized. Are there even enough qualified students to fill these positions? How would departments manage large cohorts of assistants?
- Would moving away from graduate teaching assistantships positively or negatively impact instructional quality?
- Distribution of instructional support budget and graduate assistantship budget in some departments would be significantly different from how teaching assistantship budgets are currently deployed. How do we smoothly transition to a new distribution model?
- Finally, full implementation of this model would require additional graduate assistantship budget. Can we develop a model through which the institution/departments/programs can generate revenue to support this additional budget?

Pilot Activities: For the 2016 academic year, we propose maintaining flat TA budgets to the college. The additional \$200k of new funding provided through the AY2016 budget process would be used to pilot hourly instructional support in Spring, 2016 semester. We propose to formally pilot the hourly instructional model

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in two departments, along side the more traditionally used teaching assistantship model. The Director of Assessment would assist in the development of assessment activities to evaluate the overall effectiveness of instructional support delivered through the pilot program.

In addition, the Deans would actively encourage other departments to reprogram their existing teaching assistantship budgets into hourly and graduate assistant portions and conduct their own pilot activities. In cases where departments choose to do this, we would again encourage them to work with the Director of Assessment to conduct formalized assessment of the effectiveness of these activities.

To better develop and frame these activities, during the Fall semester, Academic Affairs would pull together a working group consisting of representatives from each of the pilot program departments, the Deans, the Director of Assessment and representatives from the Department of Physics. The Physics Department has a long history of using hourly student employees to provide high-quality instructional support. The intent of this working group would be to leverage off of experience gained by the Physics Department to guide the design of pilot program efforts in other departments.

Possible Long-Term Support Mechanisms: More broadly defined graduate assistant appointments may be more competitive at recruiting high-quality graduate students into our research-intensive graduate programs rather than offering them teaching assistantship awards. As such, the more limited number of graduate assistant appointments that can be currently funded under the model proposed above (150 compared to the 175 currently supported out of TA and First-Year Fellowship funds) may be adequate to support the research enterprise. However, given the support metrics defined above, if we were to fund 202 general graduate assistant appointments, we would need to identify another \$1.7M budget. Several mechanisms could be considered in providing for this additional budget. For example:

- *Expansion of Non-Thesis Degree Programs:* Encourage departments to supplement their base graduate assistant budget through direct allocation of supplemental budget supported through additional tuition revenue generated via expanded non-thesis, non-degree special, and certificate program enrollment. In this model, the base graduate assistant budget would be fixed at the current level. Growth of this budget would be through incremental adjustments based on increases in enrollment net of costs associated with the program, or through base-building institutional prioritization of this budgetary item (i.e., the institutional graduate assistant budget would grow through the same processes currently used). Departments would be encouraged to supplement their base graduate assistant budgets by growing their non-research related educational activities, with the size of the supplemental budgetary allocation being

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directly tied to size of the new non-research enrollment.

- *Realignment of existing Adjunct Budget:* Our existing adjunct budget is \$1.5M. Could the need for adjunct instructors be reduced and this budget realigned to support graduate assistantships?
- *Realignment of Summer Tuition Fellowship Program:* The Summer Tuition Fellowship Program provides full tuition support for the required 3 credit hours of registration for all students employed on full-time RA's from which overhead is collected on the stipend. Budget for the program is \$1.7M. Could we reduce the size of institutional support for this program by converting into a Differential Tuition support program as we do during the academic year? Based on Summer 2015 enrollment, if we did this, the size of the Summer Program could be reduced by \$1.1M. If these institutional savings were reprogrammed, this would support an additional 34 graduate assistants. Obviously, the institutional savings would translate into additional costs for our research programs. At the current tuition rates, this cost would be \$2,877 of tuition for each student working as an RA during the summer.