MSU INVESTMENT PROPOSAL FOR INSTITUTIONAL PRIORITIES

PROPOSAL OVERVIEW

Title	Retention Enhancement via Supplemental Chemistry Instruction **(RESCI)**	**Request Date**	Dec 16, 2011
Department	Chemistry & Biochemistry	**Email**	cmclaughlin@montana.chemistry. edu
Requestor	Charles W. McLaughlin & John Peters	**Phone**	5399

STRATEGIC ALIGNMENT

Core Themes and Objectives (check all that apply)

Educate Students

☒ Our graduates will have achieved mastery in their major disciplines

☒ Our graduates will become active citizens and leaders

☐ Our graduates will have a multicultural and global perspective

☐ Our graduates will understand the ways that knowledge & art are created and applied in a variety of disciplines

☒ Our graduates are prepared for careers in their field

☒ We will provide increased access to our educational programs

☐ Communities and external stake holders benefit from broadly defined education partnerships with MSU

Create Knowledge and Art

☐ Students, faculty, and staff will create knowledge and art that is communicated widely

Serve Communities

☒ We help meet a fundamental need of the citizens of Montana by providing degree programs for our students

☒ We help meet the educational needs of the citizens of Montana by providing a wide range of educational opportunities to a variety of students

☒ Our students, faculty, staff, and administrators reach out to engage and serve communities

☒ Our students, faculty, staff, and administrator reach in to build the university community

Integrate Learning, Discovery, and Engagement

☒ Each graduate will have had experiences that integrate learning, discovery and engagement

☐ Outreach activities will educate students and address the needs of the communities we serve

☐ Students, faculty, and staff will create knowledge and art that addresses societal needs

☐ MSU is a community that will be characterized by synergy within and across disciplines, roles and functions.

Stewardship

☒ The public trusts the institution to operate openly and use resources wisely

☒ The faculty and staff are well-qualified and supported

☒ MSU will support Native American students, programs, and communities

☒ MSU will be an inclusive community, supporting and encouraging diversity

☒ Our publicly provided resources are used efficiently and effectively

☐ Natural resources are used efficiently and sustainably

☐ MSU nurtures a culture of resource conservation and ecological literacy among students, faculty and staff

☐ Our physical infrastructure (e.g., building, equipment, open spaces) will be well-maintained and useful

INSITUTIONAL BENEFIT						
Campuses	☒ Bozeman ☐ Billings ☐ Havre ☐ Great Falls ☐ FSTS ☐ Extension ☐ MAES					
Cross Depts	Please List:					
TIMEFRAME						
Proposed Dates	Start: Summer 2012 End: Summer 2013					
COST AND REQUIREMENTS						
Funding Type	One-Time ($)	Multi-Year ($)			Base ($)	FTE
		Year 1	Year 2	Year 3		
Personnel (*w/benefits*)	$45 000					
Materials & Supplies						
Travel						
Contracted Services						
Capital						
Other Operations						
TOTAL	$45 000					

Please comment, if necessary, regarding cost and requirements.

Summer 2012 small scale pilot:

Two graduate student teaching assistants from the department of Chemistry and Biochemistry would be supported by this request for the summer of 2012 in general chemistry 141 and 143. This cost is $5,500 per TA. Total cost for summer 2012 = 2 x $5,500 = **$11,000**

The TA would meet with two small group of 25 students assigned from larger lecture sessions twice per week to work in problem-solving sessions. This involves, in the summer sessions, five weeks x two or ten sessions in each semester.

The selected TA would meet prior to summer sessions for four hours of training detailing organization, cooperative learning strategies, teaching skills etc. with the co-PIs. The co-PIs would also meet for another hour after the summer semesters for follow-up and interviews. The co-PIs would use that information, plus student surveys, to plan the fall 2012 larger scale pilot. Co-PIs budget **$1,000 total**

Fall 2012 larger scale pilot:

Approximately 500 Chemistry 121 students in two large lecture sections would be provided with recitation-problem solving sessions.

Two recitation TAs assigned to each large section would involve each TA working with 25 students in each pre-assigned recitation section. This would require five recitation sections for each TA. (250/25 = 10 recitation sections per lecture session.) The TA would plan a weekly presentation to be used in each of their five sessions. The TAs would also attend the three lectures each week to become better attuned to the same content, vocabulary and expectations as their students. The recitation TAs would meet with the lecturer to coordinate content of the sessions.

Two TA positions for each lecture sections x two lecture sections =($8,250 per TA x 4) = **$33,000**

With success of this proposal, the Chemistry Department would seek ways to fund recitation sections to reach and assist all general chemistry students.

PROPOSAL SCOPE

Describe the Proposal

Currently, chemistry students in our introductory and general courses receive lectures in large enrollment sections with 100 to 250 students in each section. These are the largest courses offered on the MSU campus. The individual course load for each instructor is often in excess of 500 students per course. This severely limits time for students to seek individual additional help beyond the lecture. Many institutions have shown that providing well informed additional, smaller group meetings beyond the large enrollment weekly lectures have provided benefits for student learning which can enhance retention in these critical "gateway" courses at the introductory level. In this proposal we are requesting funding to support two graduate student positions that would enable our department to provide Retention Enhancement via Supplemental Instruction in Chemistry (**RESCI**).

For many students introductory chemistry is the "doorway" that leads to their future career goals. The prerequisites for medical related fields (nursing, veterinary, physician, physical therapy, nutrition and dietetics etc) include from one to two semesters of specific chemistry courses (Chem 121, Chem 141, Chem 143). Many students find these courses challenging and in some cases merely overwhelming from the sheer number of students in their class sessions. This may be particularly true for students from Montana, which features so many low-enrollment rural schools. This proposal provides two graduate students after two pre-semester training sessions to:

(A) Meet weekly with the lecture instructor, to plan an enhanced, key concept, problem-solving session to be repeated several times during the week where small groups (30-40) of students from the lecture could participate in the weekly session.

(B) The graduate students would attend the lectures of their assigned professor to hear the same material as the students and casually participate with the professor to set up in-class live demonstrations where appropriate.

(C) The graduate students would then conduct several sessions (repeating content in each) per week for students from the lecture. (i.e. in a lecture section of 200 students, eight small groups of 25 students would be assigned a specific day and time each week.) Each graduate student TA would conduct approximately five identical sessions during the week. Each student from the lecture would attend their once per week session to practice selected problems, discuss key concepts and become acquainted with, and support fellow students. These sessions could include a re-showing of selected power point slides from lecture for small group discussion, students working problems in small groups, pre-exam strategies and other ideas that may develop around student-centered suggestions.

PROPOSAL SCOPE

Describe the broader impacts and benefits of this proposal

Retention among our student population is a focus of the entire university. The advantages are quite obvious, but in particular, the role of chemistry as a fundamental prerequisite for many important and often 'critical need' majors is the focus of this proposal. Students who arrive on campus without the experiences of fast-paced, content enriched, three-times per week, lectures with 200+ students find themselves without the preparation to face these challenges and often struggle and drop out of the course. This loss, at such an early stage may cause many to face the stress of paying additional tuition to repeat the course. Others may not return because they see no advantage in putting themselves through the same daunting challenges again with no changes to the system. Others may feel that the large lecture for such a challenging course is simply not an environment in which they see an opportunity for success. A concern of ours is that this environment is particularly detrimental for minority and rural students. This pilot program's emphasis on student success and retention would directly affect the support of hundreds of students entering our foundation-level courses.

The broader impacts of successful student retention benefits will be felt in several ways. (A) Student success in one challenge often carries over to a stronger self-confidence and an enhanced view of the university experience that will carry over to other challenges. Being successful in what, for many, will be a new situation will help students to succeed in other courses. (B) The critical need that Montana faces in the health professions is, to a significant extent, our responsibility to help alleviate. This proposal would provide more opportunities for our students to keep their hopes and goals thriving as they seek to gain the necessary science-related fundamentals to pursue those critical need degrees. (C) Although, not the key focus, this proposal will help the Chemistry & Biochemistry department prepare our graduate students to have enhanced teaching experiences to enter academic professions.

Demonstrated success with this plan will lead to Department evaluation and will be the impetus for seeking to extend weekly recitations to the other large lecture courses *as is customary at our Carnegie VHR peer universities*. We point out that an additional one hour per week meeting will require increasing the number of credits from 4 to 5. Again, this is what is done at our peer institutions. We expect that the 25% growth in SCH for Chemistry & Biochemistry would generate a significant amount of the extra revenue that would be required to fund a full complement of recitation GTAs each semester.

ADDITIONAL INFORMATION

Implementation Plan *(Please describe with timelines)*

This proposal could be implemented in the summer of 2012 with Chemistry 141 and Chemistry 143 and in the Fall of 2012 in Chemistry 121.

Selection of two participating graduate students:	May 2012
Orientation with co-PIs	May 2012
Possible trials in summer sessions:	May 2012 – July 2012
Begin with Chemistry 121 recitations	August 2012 – Dec 2012
Evaluate impacts and success	Dec 2012

Assessment plans include a comparison of historical retention figures from the past three years to retention figures from the Fall semester in Chemistry 121 with the anticipation of an increase in retention due to the implementation of this plan. Since the course has been taught by the same instructor over this time period and will be taught by the same instructor in the fall of 2012 some variables, but of course not all, will be brought under control. If implemented in the summer session the same claim of identical instructor and similar course content can also be claimed. We will also test the hypothesis that weekly recitation sections can lead to higher grades on course examinations. Student feedback on the usefulness of this proposal will also be evaluated with the aim of examining the content and delivery of the weekly RESCI sessions.

If assessed objectives are not met in the timeframe outlined, what is the plan to sunset this proposal?

If, after the conclusion of this pilot program, our assessment indicates that recitation sections do not actually improve student grades and/or retention, then the plan to offer recitations to all General Chemistry students will obviously be abandoned.

RESCI Retention Enhancement via Supplemented Chemistry Instruction C&I B

SIGNATURES		
Department Head *(please print)*	**Signature** *(required)*	**Date**
Bern Kohler	Bern Kohler	**12-21-2011**
Dept Head Priority *(please circle one):* [Very High] High Medium Low Very Low		
Dean/Director *(please print)*	**Signature** *(required)*	**Date**
Paula Lutz	Paula Lutz	1-3-12
Dean/Director Priority *(please circle one):* (Very High) High Medium Low Very Low		
Executive/VP *(please print)*	**Signatures** *(required)*	**Date**
Executive/VP Priority *(please circle one):* Very High High Medium Low Very Low		