



Gateway Science and Math Course Redesign Project Description



Issues to Address

- Aspiring and declared STEM majors experience high failure rates in gateway science and math courses
- Research shows that perceived poor quality instruction in science and math courses is the primary factor leading students to depart STEM fields and is a major concern of those who persist
- Implementation of curricular and pedagogical redesign, primarily focused on various aspects of interactive engagement, has improved student learning in STEM gateway courses, across the disciplines

The Goal

The STEM Gateway pathway to successful course redesign is characterized by:

- On-going exploration and adoption of evidence-based instructional practices
- Faculty engaged in continuous improvement of teaching and learning
- Dialogue around teaching supported through a community of practice
- Teaching informed by meaningful assessment

The fulfillment of this vision will result in increased student achievement of learning outcomes, retention, and degree attainment, especially among Hispanic and low-income students.

(Inspired WIDER PERSIST, Boise State University)

Course Redesign Teams

Each course-redesign team consists of:

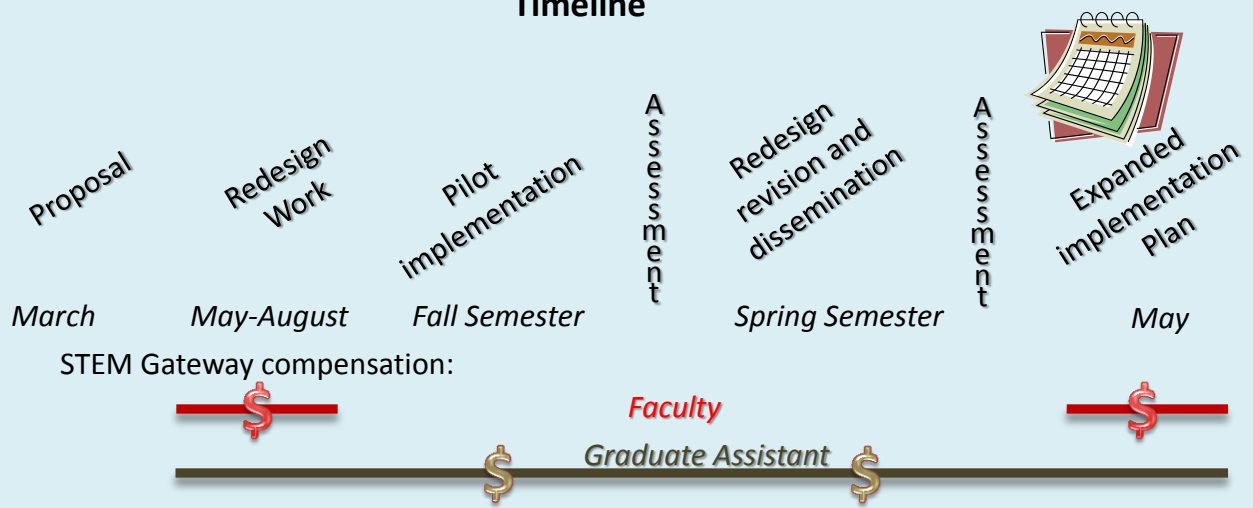
3-4 UNM faculty who frequently teach the targeted gateway course



1 UNM Graduate Assistant from the gateway-course department

At least 3 teams in each of 4 years

Timeline





**Gateway Science and Math Course
Redesign Program – Proposal
2015-2016
Due: March 16, 2015**

Important Dates

March 16, 2015: Gateway Science and Math Course Redesign proposals due. Submit to Gary Smith (gsmith@unm.edu).

April 10, 2015: Selection of three course-redesign teams announced.

May 14, 15, 18, 2015: Course-redesign teams *must* attend STEM Gateway Redesign Institute (2.5 days).

June 1-August 15, 2015: Course-redesign teams develop proposed curriculum and pedagogical redesign elements; informal meetings between teams and with STEM Gateway facilitators.

August 17, 2015: Revised syllabus for fall-semester implementation provided to STEM Gateway by course-redesign teams (with designated sections for Fall 2015 and Spring 2016 implementation).

2015-2016 Academic Year: Implementation of redesign with collection of assessment data. STEM Gateway will advise throughout the process and arrange for ongoing monthly teaching professional development activity sessions with the combined teams as a faculty learning community.

Compensation Schedule

Summer 2015 compensation for faculty and graduate assistant members of the course reform teams begins on June 1.

Fall 2015-Spring 2016 graduate assistantship (August 15-May 15) contract will be finalized upon receipt of syllabus illustrating changes proposed following the course-design institute.

Summer 2016 compensation for faculty and graduate assistant commences June 1 providing that course-redesign implementation occurred as planned and assessment data were collected.

Continue to complete proposal form

A. Foundational Information

Course number, or numbers (including department/program prefix): _____

Course name(s): _____

If the redesign will affect companion laboratory or recitation/problem solving sessions that have a separate course number/title, then please list these course numbers and titles in this space:

Typical number of sections and students taught during fall, spring, and summer semesters (listing lab and recitation/problem solving sessions separately from the lecture) for each course involved in the redesign proposal:

Purpose. What are the specific, measurable objectives of your proposed redesign project?

Significance: Why are the objectives provided above important to the recruitment, retention, and graduation of students at UNM?

B. Preliminary Redesign Plan

STEM Gateway anticipates that your redesign plan will mature and change as a consequence of subsequent participation in the course-redesign institute and during the first-summer planning effort. However, a well-developed proposal should show that the redesign team has a foundational understanding of key concepts of course design in university-level science and the assessment of student learning.

The *preliminary* plan, presented as responses to the prompts found below, should show consideration of and a commitment to implement the five elements for a scientific approach to optimization of science education (modified from the [Carl Wieman Science Education Initiative](#), University of British Columbia and the [Top 25 Project](#), Miami University):

1. Specification of measurable learning outcomes
 2. Rigorous objective assessment of student achievement of these outcomes
 3. Implementation of teaching methods aimed at maximizing achievement with respect to the specified outcomes, that are consistent with empirically established results and principles
 - Use methods to actively engage students in their learning and with other learners and, wherever appropriate, employ inquiry-driven approaches to learning
 - Reduce the amount of class time spent on low-level memory or descriptive material by incorporating approaches to facilitate students learning this material outside of class
 - Methods are built on specific student learning outcomes tied to assessment that continuously monitors student learning and modifies the course as necessary
 4. Means for easy dissemination and duplication of materials, methods, and technology to other course instructors
 5. Sustainable and continued optimization based on results of assessment
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1. List the measureable learning outcomes for the redesigned (these may be the current student learning outcomes for the course or potential revisions to those outcomes).

2. At this preliminary point in your planning, how do you plan to assess student achievement of the outcomes stated in #1?

C. Course redesign team members

Each team should consist of 3-4 UNM faculty members who regularly teach the course. Including a commonly employed part-time instructor is desirable. A graduate assistant from the UNM department will also be hired to assist the team. Each team member must commit to participating in the events and processes listed on the page 7 of this document.

UNM Faculty Member (Team Leader); Name _____

Rank/Position _____

Number of years teaching this course _____

Typical number of sections of this course taught each year _____

UNM Faculty Member; Name _____

Rank/Position _____

Number of years teaching this course _____

Typical number of sections of this course taught each year _____

UNM Faculty Member; Name _____

Rank/Position _____

Number of years teaching this course _____

Typical number of sections of this course taught each year _____

UNM Faculty Member; Name _____

Rank/Position _____

Number of years teaching this course _____

Typical number of sections of this course taught each year _____

Graduate Assistant

Each course-reform team must designate a graduate student who will serve as an assistant to the team (see Background to the Gateway Science and Math Course Reform Program). This position will be funded at 0.50 FTE during the summer 2015, at 0.25 FTE during the 2015-2016 academic year, and at 0.50 FTE during part of summer 2016. Further details, if desired, can be obtained from Gary Smith (925-0725; gsmith@unm.edu). The assistant does not have to be named at this time, but if your proposal is selected, you will need to provide the information listed below by April 15, 2015. If you have a candidate for this position, please provide this information at this time.

Name _____

Qualifications that led to selection of this person (e.g., PhD student with career aspirations in academia; experience as a teaching assistant; opportunity to engage a student from a under-represented group in preparing-future-faculty opportunity)

Certifications

All team member must sign* below, acknowledging the following:

- ✓ Commitment to attend the Designing Courses for Effective Student Learning course-redesign institute; May 14 and 15 (9 am to 3:30 pm each day) and May 18 (8:30 am to 12:00 pm), 2015
- ✓ Commitment to participate in the course-redesign effort continuously from May 2015 through June 2016 including a commitment to the five elements for a scientific approach to optimization of science education
- ✓ Commitment to implement the course-redesign elements when teaching the redesigned course during the 2015-2016 academic year, including classroom observations by project staff, and possible administration of surveys to students
- ✓ Commitment to attend at least 8 of the 12 teaching professional development activity sessions throughout the year and are responsible for following up with your team after the activity sessions
- ✓ Agreement with the content of this proposal

In addition, the *team leader* is responsible for the following:

- ✓ Collecting and submitting evaluation data
- ✓ Coordinating and facilitating team meetings
- ✓ Distributing tasks and responsibilities among team members in a manner agreed upon by the team
- ✓ Preparing the annual report at the end of the first year
- ✓ Responding to inquiries and correspondence from STEM Gateway

UNM faculty team member (leader)

Printed name _____

Signature

UNM faculty team member

Printed name _____

Signature

UNM faculty team member

Printed name _____

Signature

UNM faculty team member

Printed name _____

Signature

*If it is not readily possible to obtain all signatures at the time when proposals are due, each unsigned team member may send an email to Gary Smith (gsmith@unm.edu) that lists and acknowledges the commitments and agreement listed above.

Supporting Letter

Proposals must include a letter of support from the Department Chair that (a) certifies that the redesign proposed in the target course has broad support from the unit, and (b) provides assurances that all sections of the course will implement the redesign by the third semester. (It is expected that all sections of targeted courses will utilize the new models developed, but project implementation might only involve a select number of pilot sections during the first semester).