

Sample

PROPOSAL

**submitted to
Instructional Development Committee**

**Enhancement of Chemistry Laboratory Courses
using CBL's (calculator based laboratories)**

submitted by:

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Associate Professor

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Associate Professor

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Department Head

Natural Sciences Project Description:

Project Description:

1. Objectives:

To learn how to use the CBL and TI-86 calculator and incorporate their use in several of the laboratory experiments in ALL of the chemistry transfer courses. Initially, at least two of the CHM 1010, CHM 1020, CHM 2310 and CHM 1100 courses will be targeted. All students taking the transfer chemistry courses eventually would benefit.

2. Needs:

The need for this additional support in the chemistry laboratory is two fold. First, the concepts and techniques discussed in the laboratory portion of the course should reinforce the material learned in the lecture. This lab time allows students to practice and apply what has been taught. However, chemistry students tend to not relate lecture concepts to the lab experiments. Instead students treat lab time as a separate course. Secondly, time in the laboratory is valuable. The use of CBL's would allow more time to be spent on analyzing what happens and applying results to theory learned in lecture. The students would spend less time on procedure and more time with application.... application of lecture material and technology! This use of the calculator and computer makes for a more efficient and rewarding experience! This will help students witness real time results about chemical principles as they perform the lab experiment and allow them to gain experience in collecting and interpreting data.

3. Beneficiaries:

The students would be the main beneficiaries from the enhancement of the laboratory course with CBL's. Chemistry concepts would be reinforced using technology. At the same time this use of technology further benefits the students and the school as "technology in the classroom" is an important college mission!

4. Description of Activities:

At least two experimental techniques (pH titration of amino acids in CHM 1100, pH titration and/or buffer solutions in CHM 1020, determination of unknown concentrations using colorimetric measurements in CHM 1010 or 1020, and a variety of possibilities for the analytical course - CHM 2310) would be performed by students in a particular lab section. The students would perform the experiment with and without the use of CBL's to better see the need and significance of incorporating this technology in the lab environment. Students will be asked to compare the experiments for additional feedback.



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Project Evaluation:

The results of the data will be compared (analysis by hand and analysis using the CBL/calculator) in accuracy, precision and time needed to complete the experiment. Students will also be asked to either write a comparison or answer a "survey" designed to get feedback on the advantages and disadvantages of the two techniques.

Budget:

Two faculty members are each asking for 3 hours release time this fall semester (F98) to learn more about the use of the CBL's in the chemistry laboratory environment and to incorporate this in several lab sections. (Recently, a visit with Dr. Robert Hartshorn at UT - Martin spurred interest in teaching chemistry labs this way!) In addition, a budget of \$100.00 is requested for travel to spend a day at UT - Martin and witness their lab experience with the CBL's.

The Natural Sciences Department has 5 CBL's and some probes. Additional probes (5 pH sensors and 5 colorimetric sensors) are requested as well as 5 TI 86 calculators. The department has two computers to place in the room near the lab so students may download their data/graphs. Two TI-Graph Links are requested.

Itemized costs :	Reassigned time	<u>\$3020.00</u>
	Travel	<u>100.00</u>
	Materials	<u>1540.00 *</u>
	Total	<u>\$4660.00</u>

* TI Graph LINK (TI-GL)	\$55 ea
Sensors-Colorimetric COL-DIN	\$99 ea
pH PH-DIN	\$72 ea
TI-86 calculators	\$115 ea

