

EUE Proposal

Project ID#

Project Title

Project Director	ID Number	Telephone	Email
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Department	Campus Box	School College
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Course or Program

Project Co-Director	ID	Department	Email
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Student Impact:	<input style="width: 70%;" type="text"/>
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Priority Rating (If Submitting Multiple Proposals):	<input style="width: 20%;" type="text"/>
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Project Budget

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
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Cost-Sharing

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
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Prior EUE Support

Project Director	Project Number	Award Amount	Project Dates
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Course Redesign for Chem 120B,
“General, Organic, & Biological Chemistry”

PI: Dr. Lawrence Norcio, Department of Chemistry

Project Summary

The objective of this project is to redesign Chem 120B – General, Organic, and Biological Chemistry 2. This course is required for all students in the undergraduate Nursing programs, and also counts as a distribution course for Sciences. The Department of Chemistry will implement the Peer-Led Team Learning (PLTL) Program. This program will divide Chem 120B students into smaller groups (maximum of 10 students) which will meet for 50 minutes, once a week in the semester. Each PLTL session will be led by students who had successfully completed Chem 120B. This project also aims to:

- a) identify topics in Chem 120B that students find very challenging;
- b) design PLTL worksheets that will resolve these difficult topics; and,
- c) train prospective Peer Leaders.

The implementation of PLTL program on Chem 120A – General, Organic, and Biological Chemistry last Fall Semester 2018 had been very successful. The Department of Chemistry is convinced that it will get the same effects when applied to Chem 120B. These positive results are increased passing rates and improved student grades.

Proposal Narrative

A. Current Situation

Chem 120B is the second part of general education chemistry courses required for freshmen nursing students at Southern Illinois University Edwardsville (SIUE). Chem 120B is currently taught using the traditional method; that is, the instructor lectures in front of

Chem 120B students in a very large room. The average registered Chem 120B students in the Spring Semesters of 2016 and 2017 is 263 students.

Unfortunately, only a little more than half of the freshmen students pass this course. Figures 1a and 1b show the final grade distributions of Chem 120B from 2016 to 2017. The mode of Chem 120B student grades in 2016 and 2017 is “C”. However, if grades D, F, and W are combined, the DFW grades will become the new mode. Table 1 shows the percentage passing rates (A, B, and C grades) and failing rates (D, F, and W grades) for Chem 120B in the Spring Semesters of 2016 and 2017. Clearly, there is a need to improve the passing rates in Chem 120B.

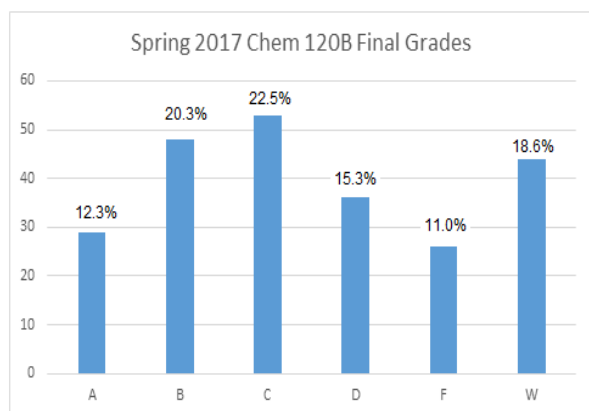


Figure 1a – Spring 2017, Chem 120B Final Grades.

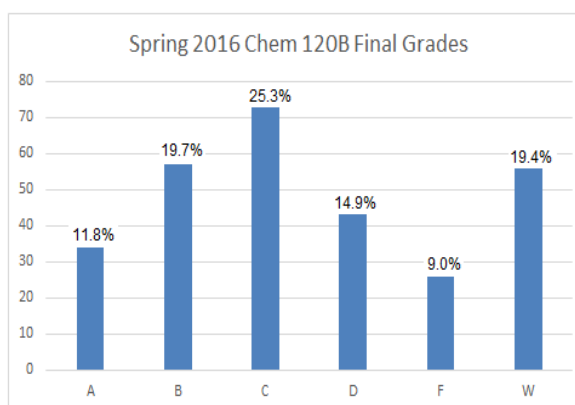


Figure 1b – Spring 2016, Chem 120B Final Grades.

Table 1 – Percent Passing Rates of Chem 120B in Spring Semesters 2016 to 2017.

	Passing Rates (ABC grades)	Failing Rates (DFW grades)
Spring 2017	55.08%	44.92%
Spring 2016	56.75%	43.25%

Funds from this EUE Award will be used for: (1) the development of PLTL materials for Chem 120B as 1-month summer salary for the PI, (2) the purchase the ChemDraw software suite to assist with Organic and Biochemistry drawing, (3) student wages for the PLTL leaders in Fall 2019 for a small pilot study, and (4) student wages for PLTL leaders for Spring 2020 with full implementation. The project will be able to continue with the implementation of modest course fees (\$20) to be used for student wages for PLTL leaders.

B. Proposed Project

The PLTL program has been used successfully in many universities¹⁻² including SIUE. In the Fall Semester 2018, the PLTL program was implemented to Chem 120A. Chem 120A is the first part of the general education chemistry courses required for freshmen nursing students at SIUE. A similar redesign method used in Chem 120A will be applied to Chem 120B.

Chem 120B students will be divided into small groups of ten students. In addition to the traditional lecture taught by the instructor, these smaller groups will attend 50-minute PLTL sessions every week in the semester. The PLTL sessions will be led by a peer leader. The peer leader is a student who had successfully completed Chem 120B. The benefits of participating PLTL sessions once a week are:

- a) Students will receive a more individualized learning with a 1:10 mentor to student ratio.
- b) Students will be able to solve problems comfortably with the guidance of a fellow student (peer leader).
- c) Interaction with fellow classmates will promote active learning and conceptual understanding.
- d) It will draw out silent/quiet students in class to ask questions or to suggest their own possible solution to a problem in a smaller group setting.
- e) They may develop friendship and may serve as support group which may
- f) increase self-confidence.

C. Project Timeline:

The PI will develop the PLTL materials and worksheets during summer, July 1 – August 15. The Department Chair, Leah O'Brien, will review the materials to check for clarity and appropriate degree of difficulty; she is familiar with this course. Approximately 48 students in Fall 2019 will be selected for a Pilot Study. Two laboratory sections of Chem 124B (a co-requisite of Chem 120B) will be selected for the Pilot Study; this assures a random selection of participants. Feedback from each week's activities will be sought, with an eye to improve questions on each worksheet. Full implementation is anticipated in Spring 2020.

Table 2 – Project Chem 120B Redesign Timeline.

Time	Plan of Action
June 2019	<ul style="list-style-type: none">• Identification of challenging topics in Chem 120B
July to August 16, 2019	<ul style="list-style-type: none">• Purchase of ChemDraw• Development and Validation of Weekly PLTL Session Worksheets• Recruit 2 students as PLTL leaders for pilot study
Fall 2019 Semester	<ul style="list-style-type: none">• Pilot run of PLTL sessions for random Chem 120B students, selected by Chem 124B Lab Section• Adjustment/Correction of PLTL Worksheets.• Training of Peer Leaders
Spring 2020 Semester	<ul style="list-style-type: none">• Implementation of PLTL program to all registered Chem 120B students

D. Evaluation

The success of this project will be measured the same way as the Chem 120A PLTL program was evaluated. Frequency curves will tell us if the mode of the class had

improved. Figures 2a and 2b show the final grade distributions of Chem 120A with and without the PLTL program. In the case of Chem 120A, the mode of the class improved from a grade of C (without PLTL) to a grade of A (with PLTL).

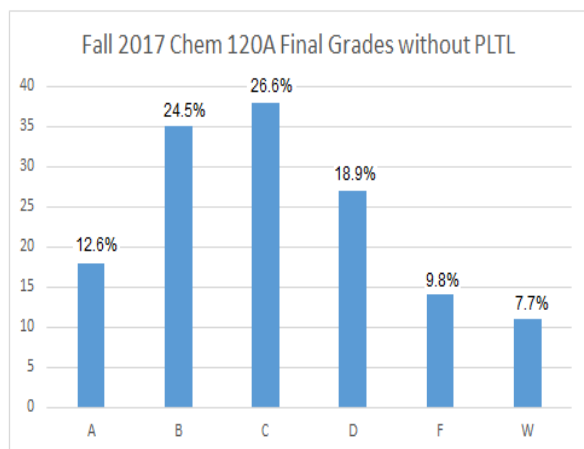


Figure 2a – Fall 2017, Chem 120A Final Grades Without PLTL

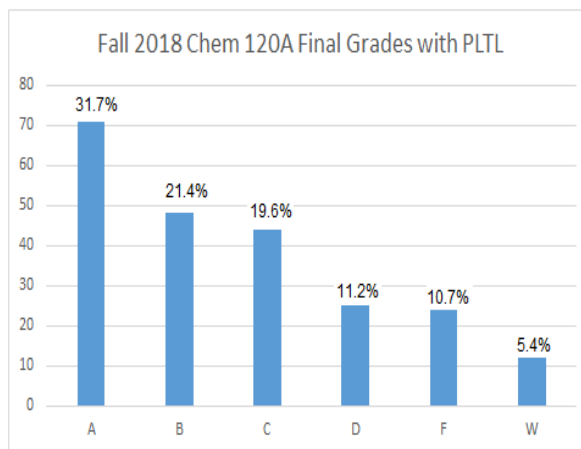


Figure 2b – Fall 2018 Chem 120A Final Grades With PLTL

The passing rates of Chem 120B with and without PLTL program will be compared. A table of passing rates (grades of A, B, and C) versus failing rates (grades of D, F, and W) will be very useful in evaluating the effectiveness of this project. The Department of Chemistry is expecting to get similar results as obtained in Chem 120A, shown in Table 3. The passing rates of Chem 120A improved from 63.6% (without PLTL) to 72.7% (with PLTL).

Table 3 – Passing Rates of Chem 120A With and Without PLTL Program.

	Passing Rates (ABC grades)	Failing Rates (DFW grades)
Fall 2017 (no PLTL)	63.6%	36.4%
Fall 2018 (PLTL)	72.7%	27.3%

Budget and Budget Justification:

Contractual Services - \$1,566.00

Chem Draw – software used to draw structures of organic and biochemical compounds.

Salaries - \$4,420.58

1 month summer salary is requested for the PI.

Student Wages for Fall 2019 - \$900.00.

Four PLTL groups will be used in Fall 2019 for the pilot study. Two PLTL leaders will be hired for 3 hrs per week for 15 weeks, and each PLTL leader will lead two PLTL sections each week and meet with the PI weekly for 1 hour to discuss subject material, strategies, and pedagogy. $2 \text{ students} \times 3 \text{ hrs/wk} \times 15 \text{ wks} \times \$10/\text{hr} = \$900$.

Student Wages for Spring 2020- \$5250.00.

With an anticipated enrollment of 270 students in Spring 2020, twenty-eight sections will be required for full implementation of PLTL in Chem 120B. Seven PLTL leaders will be hired for 5 hrs per week for 15 weeks, and each PLTL leader will lead four PLTL sections each week and meet with the PI weekly for 1 hour to discuss subject material, strategies, and pedagogy. $7 \text{ students} \times 5 \text{ hrs/wk} \times 15 \text{ wks} \times \$10/\text{hr} = \$5250$.

TOTAL Budget for AY 2020 - \$12,136.58

Department Commitment, Cost Share - \$566.00

EUE Funds Requested - \$11,570.58

CV: The PI's CV is attached.

Supporting Statements: Unit Support Statements from the Chemistry Department Chair and CAS Dean are attached.

Literature Cited:

- 1 Lewis, S. E. & Lewis, J. E. Departing from Lectures: An Evaluation of a Peer-Led Guided Inquiry Alternative. J. Chem. Educ. 82, 135 (2005).
- 2 Tien, L. T., Roth, V. & Kampmeier, J. A. Implementation of a peer-led team learning instructional approach in an undergraduate organic chemistry course. J. Res. Sci. Teach. 39, 606–632 (2002)

Results from Prior EUE Support: No prior funding from EUE.

LAWRENCE NORCIO

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(618) 650-3358
Email: lnorcio@siue.edu

HIGHLIGHTS:

Course Redesign of Chem 120A – General, Organic, and Biological Chemistry

- Identified challenging topics in Chem 120A and developed pertinent worksheets for Peer-Led Team Learning (PLTL) workshop sessions.
- Trained peer leaders and supervised the pilot run of PLTL Program in Fall 2017 Semester.
- Supervised full implementation of PLTL Program in Spring 2018 Semester.

EMPLOYMENT:

Aug 2007 – Present

Chemistry Instructor (Full-time Position)

Chemistry Department
Southern Illinois University Edwardsville
Edwardsville, IL

- Conducts regular lectures in undergraduate General, Organic, and Biological chemistry (Chem 120A or 120B) courses designed for Nursing Students.
- Conducts regular lectures in undergraduate Biochemistry I and II (Chem 351, 352, 451A or 451B) courses designed for Pre-Medical, -Dental, -Pharmacy Students as well as Biochemistry and Biology Majors.
- Coordinates and supervises undergraduate Chem 124A laboratory courses

Oct 2006 – Aug 2007

Scientist

Leinco Technologies, Inc.
St. Louis, MO

- Responsible for assuring manufactured products meet high purity product specifications and scheduled completion dates
- Performs complex manufacturing operations to purify and modify antibodies and other proteins (Operates AKTA chromatography system)
- Duties include: Clarification of Bioreactor Harvest, Diafiltration and Ultrafiltration, Purification of Proteins and Antibodies by Chromatography, Conjugation of Monoclonal Antibodies to Reporter Molecules, In Process Bio-analytical Assays, and Formulation and Final Fill Finish

EDUCATION:

Ph. D. in Chemical Engineering, December 1999

Minor: Statistics

West Virginia University, Morgantown, West Virginia

M. S. in Chemical Engineering, August 1995

Major: Biochemical Engineering

Ohio University, Athens, Ohio

B. S. in Chemical Engineering, April 1990

University of the Philippines, Los Banos, Laguna, Philippines

LIST OF PUBLICATIONS:

Lawrence Norcio, Chin-Chuan Wei, Inoka K. Pathiraja, Emily Fabry, Kyle Schafer, Nick Schimp, Tuo-Ping Hu. "Removal of Acid Yellow 25 from Aqueous Solution by Chitin Prepared from Waste Snow Crab Legs." *Journal of Encapsulation and Adsorption Science*, **2018**, 8, pages 139-155.

Lawrence Norcio, Mahesh V. Iyer, Alex Punnose, Edwin L. Kugler, Mohindar S. Seehra, and Dady B. Dadyburjor. "Catalysis for Synthesis Gas Formation from Reforming of Methane." *Topics in Catalysis*, **2004**, 29 (3/4), pages 197-200.

Lawrence Norcio, Mahesh V. Iyer, Edwin L. Kugler, and Dady B. Dadyburjor. "Kinetic Modeling for Methane Reforming with Carbon Dioxide over a Mixed-Metal Carbide Catalyst." *Industrial & Engineering Chemistry Research*, **2003**, 42(12), pages 2712-2721.

Lawrence Norcio, Dady B. Dadyburjor, and Edwin L. Kugler. "Product Distributions and Carbon Balances in Higher-Alcohol Synthesis Using Molybdenum-Based Catalysts." *American Chemical Society, Fuel Chemistry Division, Preprints*, **2001**, 46(2), pages 432-433.

Lawrence Norcio, Mahesh V. Iyer, Dady B. Dadyburjor, and Edwin L. Kugler. "Methane Reforming with Tungsten Carbide Catalyst." *American Chemical Society, Fuel Chemistry Division, Preprints*, **2001**, 46(2), pages 434-436.

Lawrence Norcio, Jisheng Zhu, Edwin L. Kugler, Dady B. Dadyburjor, Jianli Yang, Zhenyu Liu and Bing Zhong. "Characterization of Hexane Soluble Oils From Liquefaction of Two Bituminous Coals," *Journal of Fuel Science and Technology*, **2001**, 29(3), pages 214-218.

Lawrence Norcio and Edwin L. Kugler. "A Study on Aging of Coal Liquids By High Performance Liquid Chromatography." *American Chemical Society, Division of Petroleum Chemistry, Inc., Preprints*, **1999**, 44(2), pages 178-182.

Lawrence Norcio, Jisheng Zhu, Edwin L. Kugler, Dady B. Dadyburjor, Jianli Yang, Zhenyu Liu and Bing Zhong. "Boiling Point distributions of Coal derived oils". *The 6th Japan-China Symposium on Coal and CI Chemistry Proceedings*, Zao, Miyagi, Japan Oct.13-17, **1998**, pages 200-203.

Lawrence Norcio and Edwin L. Kugler. "Determination of the Molecular Weight Distribution of Different Types of Heavy Oils Using An Evaporative Light-Scattering Detector." *National American Institute of Chemical Engineers Meeting*, Los Angeles, California, November 16-21, **1997**.

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

Date: 6 March 2019
To: EUE Review Committee
From: Leah O'Brien
Re: Letter of Support for EUE project from Dr. Lawrence Norcio

I strongly support the EUE proposal submitted by Dr. Lawrence Norcio, "Course Redesign for Chem 120B, 'General, Organic, & Biological Chemistry'." If funded, this project will add weekly PLTL workshops to this course, with a goal of retention through better understanding of the course material. This approach has been very successful in Chem 120A, the first half of this two-semester course. Dr. Norcio was the PI for that project, and thus is well-qualified to implement these changes as described in the proposal

In support of this proposal, the Department of Chemistry is willing to commit \$566 cost-share to purchase the ChemDraw software package for Dr. Norcio. Additionally, if funded, the Department will submit the Course Fees request paperwork in Fall 2019, to add \$20 per student course fees for Chem 120A effective Fall 2020.

The work described is consistent with the funds that are requested, and the funding for Dr. Norcio and the PLTL leaders is reasonable and appropriate. I am confident in the successful development of the PLTL approach with full implementation in Chem 120B in Spring 2020.



COLLEGE OF ARTS AND SCIENCES, OFFICE OF THE DEAN

To: Excellence in Undergraduate Education

From: Greg Budzban, Dean, College of Arts and Sciences

A handwritten signature in black ink, appearing to read "Greg Budzban".

Subject: Dean's Memo of Support

Date: 12 March, 2018

The College of Arts and Sciences strongly supports the application of Dr. Lawrence Norcio for an EUE grant to support development of a Peer-Led Team Learning component for Chem 120B – General, Organic, and Biological Chemistry. Implementation of PLTL in other courses has been shown to relate to increased student success. This course serves several hundred students a year, and is part of the curriculum supporting the Nursing program. This is a course redesign project that targets an EUE priority of course redesign with student-centered pedagogies.

Over half of the budget is for student wages to lead the PLTL sections in fall and spring of FY20. The long-term strategy for continued implementation of PLTL for the course is incorporation of a course fee, which has been used similarly for PLTL in other courses. The budget also includes one month of salary for the faculty member to work on course redesign, and funds to purchase software that will be used for teaching the course in FY20 and future years. The Department of Chemistry has indicated that it will cost share in the amount of \$556 which is almost 5% of the total budget. We expect future implementation of the PLTL sections to be accommodated with existing faculty resources in the department.

PerkinElmer Informatics, Inc.

SIUE
Lawrence Norcio
lnorcio@siue.edu
6186503558

Please place your order to:
PerkinElmer Informatics, Inc.
940 Winter Street
Waltham, MA 02451, USA

Please submit your purchase order to the
account representative listed to the right.

Prepared By Meghan Sawicki
meghan.sawicki@perkinelmer.com
781-663-5992

Quote Name SIUE_CDPRO Norcio

Quote Number Q-15654

Quote Date 2/21/2019

Quote Expires 3/23/2019

Licenses

Part Number	Product Name	Qty	Term	Net Price
INF02092	ChemDraw Professional provides all the tools needed to create, manage and explore chemically correct, publication-ready chemical drawings. It includes ChemDraw Professional and Chem3D Pro plus the ability to search SciFinder, Reaxys and ChemACX, generate systematic names from structures and vice versa, predict 1H and 13 C NMR spectra, draw amino acid and DNA/RNA sequences with the HELM Toolbar. It also features ChemFinder Standard, ChemDraw for Excel and ChemScript. Named User. Perpetual License. (Mac users may need to install some components on a Windows OS). Includes ChemDraw Cloud Subscription.	1	n/a	\$1,566.00

LICENSE TOTAL: USD 1,566.00

Quote summary per above details Prices shown in USD

	Net Price
Licenses	USD 1,566.00
Maintenance	USD 0.00
Services	USD 0.00
Cloud	USD 0.00
Grand Totals	USD 1,566.00

Notes

Term Notes

The ChemDraw Cloud Subscription begins from date of delivery of ChemDraw Professional licenses and renew for additional one year term(s) solely if Customer pays for annual maintenance for the ChemDraw Professional license(s). If Customer's annual maintenance for ChemDraw Professional license(s) expires; the right to use the Cloud Subscription(s) terminates and Customer's access to the Cloud Subscription(s) shall end.

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