

Los Angeles Southwest College

Program Review

2010

Program: CHEMISTRY

Initiator: Dr. Pogban Toure

Reviewer 1: LaShawn Brinson, Leonard Apenahier

Reviewer 2: Angela Jenks

Date first draft of review was completed by initiator: 10/15/10

Instructions:

- Please answer all relevant areas as thoroughly as possible. Click on hyperlinks (indicated with an underline) to access additional information and instructions.
- **IF A PARTICULAR MODULE OR QUESTION DOES NOT APPLY, PLEASE INDICATE BY WRITING IN LARGE CAPITAL LETTERS: "NA"**
- The initiator should collaborate with as many department/program members as possible while completing the review.
- Reviewers should give as much feedback as necessary.

WE THE UNDERSIGNED CERTIFY WE HAVE READ THIS PROGRAM REVIEW AND ACCEPT IT AS ADEQUATE AND COMPLETE.

Department Chair

Date

Dean

Date

Vice-President

Date

TABLE OF CONTENTS

Overview of Program Mission	3
Module One: Response to Demand	3
1.0 Enrollment and Class Size	3
Module Two: Demographics and Student Success	5
2.0 Ethnicity	5
2.1 Age and Gender	6
2.2 Retention	6
2.3 Successful Course Completion	6
2.4 Degrees and Certificates Awarded	7
Module Three: Program Resources	9
3.0 Facilities, equipment, and/or supplies	9
3.1 WSCH per FTEF	9
3.2 Professional development	10
Module Four: Educational Programs	12
4.0 Courses with outdated outlines	12
4.1 Inactive courses	12
4.2 New Courses	13
4.3 Vocational Programs	14
Module Five: Student Learning Outcomes (SLOs)	15
5.0 Program SLOs	15
5.1 Course SLOs	16
5.2 Certificate SLOs	18
5.3 Student awareness of SLOs	19
5.4 Use of SLO assessment in planning and decision-making	19
Module Six: Student Feedback	21
6.0 Data collection	21
6.1 Results	21
Module Seven: SWOC	23
Module Eight: Objectives from 2008-2009 Mini-Review	24
Module Nine: 2010 Program Review Objectives	25
Module Ten: Resource Priority Requests	27
Concluding Comments and Recommendations	28

Overview of Program Mission

Describe the program's mission as it relates to the [college's mission](#).

The chemistry program will prepare a student to enter a four-year college for studying pre-medicine, pre-pharmacy, pre-dental, biology, chemistry (research), environmental science and other related fields.

Module One: Enrollment Trends

Enrollment

	2007-2008	2008-2009	2009-2010
Day	191	236	263
Evening	62	62	61
Total	253	298	324

Average Class Size

	2007-2008	2008-2009	2009-2010
Day	27.3	29.5	32.9
Evening	31.0	31.0	30.5
Total	28.1	29.8	32.4

1.0 Describe the trends in **enrollment and average class size**.

The enrollment and average class size increased for day classes whereas they remained about the same for evening classes. The increase in enrollment for day classes is due to the fact that CHEM 102 is now being offered in the spring and there is also a high demand for CHEM 51 day classes.

1.1 Given the data, what are the implications of these trends for your program? What must be done differently or kept the same given these trends?

The increase in average class size for CHEM 51 leads to an increase in the student/ instructor ratio and less hands-on experience in lab since students have to work in groups due to the limitations in equipment, glassware and materials. The implication for our program is the possibility of offering an additional CHEM 51 class; therefore, there is a need for hiring another part-time chemistry instructor, and for obtaining more supplies and equipment to run the labs.

The ability of our program to currently offer day and evening CHEM 51 sessions allows students who work in the day to take the course in the evening (or vice versa).

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Objective for Module One

Write an objective, if applicable, to address the identified trends. Objectives should be linked to the LASC [Strategic Planning Goals](#).

Objective	To respond to the high demand for the CHEM 51 class, which is a pre-requisite to General Chemistry courses and other related fields such as nursing and biology, hire an additional adjunct instructor and request a budget to buy additional supplies and equipment.
Planned Activities	<ol style="list-style-type: none">1) Hire an additional adjunct instructor to teach the class.2) Request a budget to buy additional supplies and equipment to run the course.
Individual Responsible	G. Yoshida
Start Date	Fall' 11
Method of Evaluation	Increase in enrollment in CHEM 51 courses and increase such success rate by 5%.

Module Two: Demographics and Student Success

Ethnicity

Ethnicity (%)	2007-2008	2008-2009	2009-2010
Asian	3.2%	3.7%	6.8%
Black/African American	61.3%	63.4%	63.6%
Hispanic	19.8%	16.8%	17.3%
Native American	0.0%	0.3%	0.3%
Pacific Islander	0.4%	0.7%	0.6%
Caucasian/White	1.2%	0.0%	1.2%
Other	5.1%	2.3%	1.2%
Unknown/Decline To State	9.1%	12.8%	9.0%

2.0 Given the data, describe the trend in **ethnicity**. What are the implications for your program?

The trend noted for ethnicity is as follows: Diversity in terms of ethnicity is apparent with African Americans (64%) and Hispanics (17%); this is consistent with the community the college serves. Although the percentages for African-American and Hispanic students has remained fairly constant, there is a sharp increase in the percentage of Asian students, possibly due to the fact that more advanced courses (General Chemistry II and Organic Chemistry) are now being offered during regular semesters. These advanced courses are for science-major students and are required for biology, medical, pharmacy and dental schools, and many Asian students tend to major in science.

Age

Age Group	2007-2008	2008-2009	2009-2010
19 and under	18.6%	16.4%	23.1%
20-24	29.2%	30.5%	30.6%
25-29	16.2%	17.4%	15.7%
30-34	12.6%	12.4%	11.1%
35-39	12.6%	11.4%	8.0%
40-49	7.5%	9.1%	8.6%
50+	3.2%	2.7%	2.8%

Gender

Gender	2007-2008	2008-2009	2009-2010
Female	77.9%	76.8%	72.2%
Male	22.1%	23.2%	27.8%

2.1 Given the data, describe the trends in **age and gender**. To what do you attribute the age and gender patterns?

The trends noted for age and gender are the following: the majority of the students are 24 years of age or younger and mostly females (72.2% in 2009-2010) compared to males (27.8% in 2008-2009). There is, however, a small increase in males (23.2 % in 2008-2009 to 27.8% in 2009-2010). The higher percentage of women in the program could be explained by the fact that the department also offers CHEM 51 (Introductory Chemistry) course, a pre-requisite for the nursing program which is a very attractive field to women, and the ratio of women to men in CHEM 51 can be 5 to 1 (or higher).

Retention

To access retention data according to ethnicity, gender, or age group, click [here](#).

	2007-2008	2008-2009	2009-2010
% Day	81.2%	87.7%	75.3%
% Evening	87.1%	71.0%	86.9%
% Total	82.6%	84.2%	77.5%

2.2 Given the data, describe the trend in **retention** that can be identified. What are the implications for your program?

The overall trend in retention shows a decrease of 5.1% from 2007-2008 to 2009-2010. A decrease in enrollment in a lower-level course may affect enrollment in higher-level courses and other related fields such as biology and nursing. To increase retention, 1) more tutors should be hired to assist students in all the chemistry courses; currently, there is only one tutor available for CHEM 51 courses; 2) students must meet the requirements before enrolling in a given course; the students that are identified for not meeting the requirements will be directed to the proper course. Pre-requisites for all the courses have been identified and are listed in the course outlines of records and the schedules of classes; 3) It is also recommended that Admissions and Records verify that students meet the pre- or co-requisite requirements before enrolling in a class; 4) It is also necessary that all counselors be properly instructed on each course's requirements and the sequence of the courses in Chemistry so that prospective students are properly advised.

Success Rates

To access success rate data according to ethnicity, gender, or age group, click [here](#).

	2007-2008	2008-2009	2009-2010
% Day	69.1%	64.8%	57.0%
% Evening	50.0%	59.7%	60.7%
% Total	64.4%	63.8%	57.7%

2.3 Given the data, describe the trend in **successful course completion** rates.

The trend in successful course completion shows a drop in successful completion due to an increase in more advanced chemistry courses and enrollment.

2.3.1 To what do you attribute this trend in successful course completion? Include any observations from the classroom, school, or community environments.

This trend can be attributed to students enrolling in these courses without having the prerequisites. Some students even enroll in Organic chemistry without having passed General Chemistry I. It is also common that students take chemistry courses concurrently at different campuses, and this turns out to be a very heavy load leading to students dropping from a course. Student prerequisites need to be checked to increase retention and success in all chemistry courses

2.3.2 What are the implications of this trend in successful course completion for your program?

At this time, there are no certificates or degrees offered in the Chemistry program. Presently the Department is in the process of getting the AS degree in Chemistry.

Degrees and Certificates Awarded

	2007-2008	2008-2009	2009-2010
Degrees	0	0	0
Certificates	0	0	0
Skills Certificates	0	0	0

2.4 Given the data, describe the trend in **degrees and certificates** awarded.

There are no degrees or certificates offered in Chemistry at this time.

2.4.1 To what do you attribute this trend in degrees and certificates awarded? Include any observations from the classroom, school, or community environments.

N/A

2.4.2 What are the implications of this trend in degrees and certificates awarded for your program?

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N/A

Objective for Module Two

Write an objective, if applicable, to address the identified trends. Objectives should be linked to the LASC [Strategic Planning Goals](#).

Objective #1	Increase retention and success rates by 5% in all the Chemistry courses. This can be achieved if prerequisite requirements are enforced and planned activities are funded.
Planned Activities	Ensure adequate tutoring is available to all students. Two tutors for Chem 51 and tutor for each of the other advanced courses (CHEM 101, 102, 211 and 212).
Individual Responsible	G. Yoshida P. Toure
Start Date	Fall' 10
Method of Evaluation	5% increase from 2009 baseline.

Objective #2	Finalize AS Degree in Chemistry
Planned Activities	Prepare final draft of new degree application and submit to Curriculum Committee.
Individual Responsible	P. Toure and G. Yoshida
Start Date	Fall 2010
Method of Evaluation	Offering an AS degree in Chemistry

Module Three: Program Resources

- 3.0 Discuss any needs in facilities, equipment, and/or supplies to support program goals. If requesting additional support, develop an objective.

The following are needed to support the Chemistry program goals:

A) Equipment and Supplies

- 1) 25 gas measuring burets (C01405, 50 mL) and 25 straight burets (03-700D, 100 mL). Most of the burets currently available (not enough for of them for the classes) are either broken or in poor conditions and cannot be used to provide reproducible data.
- 2) 2 CS crucibles high form (07-965E) and 1 CS crucible covers (07-970F) . The crucible available for the labs are in very poor condition and cannot be used to yield expected experimental data, making very difficult to properly assessed the work of the students.
- 3) 20 ea. Flame burners (03-962Q)
- 4) 25 ea. Tubing Flex Rub Ends for the burners (14-185-5A)
- 5) Evaporating dishes (80mL, Coors No. 60198, Cat. No. 08-690C, 2 cases of 24/each).
- 6) At least two fire extinguishers in each of the chemistry labs for safety reasons.
- 7) A phoe in each of the Chemistry Labs to be able to call 911, campus police or the fire department in case of an accident
- 8) Computers available in the Chemistry labs with internet capabilities to access various chemistry websites and equipped with software described in the course outlines (for organic chemistry, CHEMDRAW and Spartan programs).
- 9) Chemdraw Pro 11.0 (listed in the official course outline)
- 10) Mel-Temp equipment for organic chemistry labs (there is currently only one available for the lab)- Cat No. 12-144-63 (need 10)
- 11) Envirosafe thermometers (-10 to 260 °C) , Cat No. 12-144-63 (need 30)
- 12) Microchemistry kits contain all glassware to run microscale experiments, standard kit Cat No. 11-304 (need 6)
- 13) Additional analytical balances (some of the balances currently in the lab are not functioning properly)
- 14) Waste containers to properly collect and discriminate chemical wastes for proper chemical waste management.
- 15) Miscellaneous chemicals to properly run the labs

B) Personnel

- 1) Hire at least 2 additional tutors for the more advanced courses (CHEM 101,102, 211 and 212) in Learning Center. Currently, there is only one tutor for CHEM 51 (Introductory Chemistry) course
- 2) Hire an additional part-time CHEM 51 instructor for a day class since there is very high demand for this course. This would lead to better manageable average class size for the other sections (particularly for the Labs)
- 3) Hire an additional part-time lab technician. A stockroom personnel must always be present and available when a lab is in session. The stockroom attendant can assist the instructor in case of an accident or if there is a need for additional materials to run the lab.

WSCH per FTEF

	2007	2008	2009
Chemistry	479	485	668

3.1 Given the data, describe the trend in [WSCH per FTEF](#).

The trend in WSCH per FTEF shows a sharp increase from 2008 to 2009. This trend is due to the fact that CHEM 102 is now being taught during a regular semester, and there is also an overall increase in the average class sizes for all sections, particularly CHEM 51 courses.

3.1.1 Describe how this trend will impact your program. Does the program make effective use of its personnel? Include any need for increasing or reducing your program faculty.

The trend shows that there is a need to hire an additional part-time instructor for a day CHEM 51 section due to the high demand for the course. This would allow a better student/teacher ratio for this course, thus improving students' success in this course. Chem 51 is a required course for the nursing program and is also a pre-requisite to General Chemistry I. Improving students' success in this course can lead to maintaining or improving enrollment in both the nursing program and General Chemistry I course.

3.2 List each faculty member in your program. Mark all professional development activities engaged in by each faculty member in your program since Fall 2005. (To add additional rows: Hit "Tab" at the end of the last row to add an additional blank row. Select the text and check boxes from the row above and press "Edit-Copy." Click on the blank row and press "Edit-Paste".)

Name	Activities (Mark all that apply)	Comments (Optional)
Dr. Pogban Toure Chemistry Instructor	<input checked="" type="checkbox"/> Conferences <input checked="" type="checkbox"/> Off-Campus Presentations <input checked="" type="checkbox"/> Publications <input type="checkbox"/> Grants <input type="checkbox"/> On-Campus Presentations <input checked="" type="checkbox"/> Other	
Celestine Tillman Adjunct Faculty	<input checked="" type="checkbox"/> Conferences <input type="checkbox"/> Off-Campus Presentations <input type="checkbox"/> Publications <input checked="" type="checkbox"/> Grants <input type="checkbox"/> On-Campus Presentations <input checked="" type="checkbox"/> Other	
Dr. Kenneth Rodriguez Adjunct Faculty	<input checked="" type="checkbox"/> Conferences <input type="checkbox"/> Off-Campus Presentations <input type="checkbox"/> Publications <input type="checkbox"/> Grants <input type="checkbox"/> On-Campus Presentations <input checked="" type="checkbox"/> Other	
	<input type="checkbox"/> Conferences <input type="checkbox"/> Off-Campus Presentations <input type="checkbox"/> Publications <input type="checkbox"/> Grants <input type="checkbox"/> On-Campus Presentations <input type="checkbox"/> Other	

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Objective for Module Three

Write an objective, if applicable, to address the identified trends. Objectives should be linked to the LASC [Strategic Planning Goals](#).

Objective (1)	Hire an additional adjunct chemistry instructor to meet the high demand for the CHEM 51 course and maintain an adequate average class size of 25 students for CHEM 51.
Planned Activities	Request the offering of an additional Chem 51 courses during the day and expand the supply and equipment budget for chemistry.
Individual Responsible	G. Yoshida
Start Date	Fall 2011
Method of Evaluation	Hiring of an additional adjunct chemistry instructor.

Objective (2)	Hire a part-time Chemistry Lab Technician to assist evening lab instructors. A stockroom personnel must always be available any time lab is taught to assist the instructor in case of accident and when materials are needed to conduct the lab.
Planned Activities	Request lab technician position from administration.
Individual Responsible	G. Yoshida
Start Date	Spring 2011
Method of Evaluation	Approval of position for hiring.

Objective (3)	Equip each chemistry lab with at least two fire extinguishers and a phone to be able to call 911 or campus police in case of an accident. These items are required for a chemistry lab as part of the safety protocol.
Planned Activities	Ensure that adequate safety equipment is available in the laboratory.
Individual Responsible	P. Toure and G. Yoshida
Start Date	Fall 2010
Method of Evaluation	Installation of phone and 2 fire extinguishers in each chemistry lab.

Objective (4)	Equip the laboratory with a computer with internet capabilities to access chemistry websites and with softwares such as Chemdraw and PC Spartan.
Planned Activities	Ensure course is taught as indicated in the course outline of record. Work requests to IT for internet connectivity.
Individual Responsible	G. Yoshida
Start Date	Fall 2010
Method of Evaluation	Internet access in chemistry labs

Module Four: Educational Programs

- 4.0 Identify all program courses listed in the [catalog](#) that are due to be updated (i.e., course outlines were last updated in 2006 or earlier). Describe plans for updating these outlines. Click [here](#) to access the most recent course outline summary that lists LASC courses and their update status. (To add additional rows: Hit “Tab” at the end of the last row to add an additional blank row. Select the boxes from the row above and press “Edit-Copy.” Click on the blank row and press “Edit-Paste”.) **All Course outlines have been updated**

Outdated Course	Last Updated	Plan for Updating	Update completion deadline

- 4.1 For courses that have not been offered in over three years, identify your plans for the upcoming year. Provide justification or extenuating circumstances to keep these inactive courses listed. (**Note:** All course changes, additions, and removals must be approved by the Curriculum Committee.) Click [here](#) for a list of courses that have not been offered since Fall 2007. (To add additional rows: Hit “Tab” at the end of the last row to add an additional blank row. Select the text and check boxes from the row above and press “Edit-Copy.” Click on the blank row and press “Edit-Paste”.)

Inactive Course	Action	Comments
Chem 70	<input type="checkbox"/> Recommend Archive <input checked="" type="checkbox"/> Remain listed <input type="checkbox"/> Other (please detail):	The course will be taught if there is a high demand for it. A part-time instructor will then be hired to teach the course.
	<input type="checkbox"/> Recommend Archive <input type="checkbox"/> Remain listed <input type="checkbox"/> Other (please detail):	

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4.2 Enter new courses that are planned. (**Note:** All course changes, additions, and removals must be approved by the Curriculum Committee.) (To add additional rows: Hit “Tab” at the end of the last row to add an additional blank row. Select the text and check boxes from the row above and press “Edit-Copy.” Click on the blank row and press “Edit-Paste”.)

New Course	Justification (check all that apply)
Not applicable	<input type="checkbox"/> Advisory committee <input type="checkbox"/> Prerequisites <input type="checkbox"/> Integration of technology <input type="checkbox"/> Similar CSU/UC lower division requirements <input type="checkbox"/> Course needed for sequence <input type="checkbox"/> Integrating current trends and new information <input type="checkbox"/> Other (please detail):
	<input type="checkbox"/> Advisory committee <input type="checkbox"/> Prerequisites <input type="checkbox"/> Integration of technology <input type="checkbox"/> Similar CSU/UC lower division requirements <input type="checkbox"/> Course needed for sequence <input type="checkbox"/> Integrating current trends and new information <input type="checkbox"/> Other (please detail):

4.3 Vocational Programs (if applicable; if not, skip to Objective for Module Four)

4.3.1 How does your program meet **labor market demand**? Cite specific examples and sources.

Not Applicable

4.3.2 Do your program have an **advisory board**? How often does your advisory board meet? When was the last meeting? List outcome(s) of your advisory board meetings.

Not Applicable

4.3.3 What **employment data** do you have that demonstrates the effectiveness of your program?

Not Applicable

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Objective for Module Four

Write an objective, if applicable, to address the identified trends. Objectives should be linked to the LASC [Strategic Planning Goals](#).

Objective	
Planned Activities	
Individual Responsible	
Start Date	
Method of Evaluation	

Module Five: Student Learning Outcomes (SLOs)

- 5.0 Identify 2-5 [student learning outcomes](#) for each of the **degree programs** you offer and provide an [assessment strategy](#) for each outcome. In the following chart,
- Indicate the assessment strategy and when assessment will occur (Fall 2010/Spring 2011)
 - If any of your program SLOs were already assessed, include analysis of assessment results and plans for improvement of teaching and learning. Include overall results from program faculty dialogue (attach minutes from meetings as evidence of this dialog).

<u>LASC Institutional SLOs</u>	
1.	Communication (Oral and Written Skills) <ul style="list-style-type: none"> ○ use language (oral and written) and non-verbal modes of communication appropriate to the audience and purpose.
2.	Cognition (Reading Comprehension, Computational Skills, and Critical Thinking) <ul style="list-style-type: none"> ○ use critical thinking and computational skills to analyze, synthesize, and evaluate ideas and information.
3.	Information Competency (Information Competency and Technological Literacy) <ul style="list-style-type: none"> ○ utilize research skills necessary to achieve educational, professional, and personal objectives.
4.	Social Responsibility (Responsible Citizenship and Valuing Diversity) <ul style="list-style-type: none"> ○ demonstrate sensitivity to and respect for others and participate actively in group and civic decision making.
5.	Personal and Professional Development (Employability and Confidence Building) <ul style="list-style-type: none"> ○ demonstrate self-management, maturity, and growth through practices that promote physical, mental, and emotional well-being.

- If applicable, indicate which Institutional SLO (#1-5) the program SLO is linked to. Click [here](#) for a link to all of the degree/certificate programs that should have at least 2 SLOs. Click [here](#) to see a sample entry for this form.

If your program offers more than one degree, you will need to expand this chart to identify SLOs for each one. To do so, select the entire chart and press “Edit-Copy.” Click in the blank space below the original chart and press “Edit-Paste.”

Program Title: CHEMISTRY				
Program SLO	Target Courses to be Assessed	Assessment Strategy & Timing	Results and Plans for Improvement (if applicable)	Related Institutional SLO (mark all that apply)
1. Using problem solving skills, solve problems related to chemistry.	CHEM 51	embedded assessment in final exam(two sessions were assessed: one morning session and one evening session) <input checked="" type="checkbox"/> Fall 2009 <input type="checkbox"/> Spring 2011	RESULTS SLO1. FALL 2009 Two sections (one morning and one evening) were assessed. A total of 39 students were assessed. Results indicated that 45% of students scored at least	<input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5

			70%. Desired target was, therefore, not met PLANS FOR IMPROVEMENT 1. Organize more practice or discussion sessions in lab and provide additional homework problems to the students. Re-emphasize more on the relationship between pH and the molar concentrations of H ⁺ and OH ⁻ in solutions in lecture. It is also noted that many students lack the basic math skills covered in Math 115 to be successful in the class. Currently, Math 115 is a co-requisite to CHEM 51. This requirement must be enforced. These improvement plans have been implemented during Spring 2010 and Fall 2010 and will be reassessed in Spring 2011.	
2. Interpret, predict and use Chemical reactions	CHEM 101, CHEM 102, CHEM 211, or CHEM 212	Embedded assessments in midterm exams or final exam. <input type="checkbox"/> Fall 2010 <input type="checkbox"/> Spring 2011		<input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
3. SLO 3: Name chemical compounds	CHEM 212	Embedded assessment in final exam <input checked="" type="checkbox"/> Spring 2010 <input type="checkbox"/> Spring 2011		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5

4. SLO 4: Perform laboratory methods, follow chemical procedures, maintain a laboratory notebook and write a lab report	CHEM 101, CHEM 102, CHEM 211, or CHEM212 (LAB)	Embedded assessment in lab reports <input type="checkbox"/> Spring 2010 <input type="checkbox"/> Spring 2011	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
5. SLO 5: Determine and analyze chemical structures using spectroscopy, and predict physical and chemical properties.	CHEM 211 or CHEM 212	Embedded assessment in midterm exams, final exams or lab reports <input type="checkbox"/> Spring 2010 <input type="checkbox"/> Spring 2011	<input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5

- 5.1 List each course in your program as well as each course's SLOs according to the most recent course outline of record. (Click [here](#) to access a master list of all courses and recorded SLOs.) Indicate whether the course SLO ties directly to a program SLO. Indicate whether the course SLO ties directly to an institutional SLO.

If the course ties in to multiple degree programs with separate SLOs, use the text box to describe the relationship between the course SLO, program SLOs, and Institutional SLOs.

To add additional rows for more courses: Hit "Tab" at the end of the last row to add an additional blank row. Select the text and check boxes from the rows above (for the course, three SLOs and check boxes) and press "Edit-Copy." Click on the blank row and press "Edit-Paste".

Course Name, Number, and SLOs		Related Program SLO (mark all that apply)	Related Institutional SLO (mark all that apply)
Course name: Chemistry 51	SLO 1: demonstrate proficiency in performing conversions within the metric or English systems, or between the English and metric systems. (70% of students will score 70% or more)	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 2: demonstrate proficiency in naming a compound given its chemical formula or vice versa (70% of students will score 70% or more)	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 3	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
Course name:	SLO 1: Demonstrate proficiency (70-80% meet	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4

Chemistry101	expectation, > 80% exceed expectation) in solving stoichiometry problems involving solutions, acids and bases, or gases (Lecture)	<input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 2: Calculate the apparent gram molecular weight of air (at least 70% of students correctly solve problem)-laboratory	<input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 3:	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
Course name: Chemistry 102	SLO 1: Calculate the pH of a solution at various stages of an acid-base titration (At least 75% of the students will score 70% or higher on assessment)- Lecture	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 2:Use qualitative analysis to identify cations in a mixture (laboratory).	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 3:	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
Course name: Chemistry 211	SLO 1: Classify organic compounds based upon their functional groups (lecture).	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 3	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 2: Determine the structure (arrangement of atoms) of a given compound using IR and NMR spectra (70% meets expectation) (laboratory)	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 3: Determine the purity of a give compound based on melting point (At least 70% of students achieving purity within 3-5 degrees of expected melting point)-Laboratory.	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 3	<input checked="" type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
Course name: Chemistry 212 CHEM 212	SLO 1: Name an organic compound given its formula or vice versa. (lecture) (At least 75% of the students will score 70% or higher on assessments).	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 3	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3
	SLO 2: Synthesize selected organic compounds using proper techniques	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 5	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 5

	and determine their yield and melting point (laboratory). (At least 70% of students achieving purity within 3-5 degrees of expected melting point, and at least 70% achieving at least 70% yield)	<input type="checkbox"/> 3	<input type="checkbox"/> 3
	SLO 3:	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3	<input type="checkbox"/> 1 <input type="checkbox"/> 4 <input type="checkbox"/> 2 <input type="checkbox"/> 5 <input type="checkbox"/> 3

- 5.2 Identify 2-5 Student learning Outcomes for any [certificate programs](#) within your area. In the following chart,
- List the certificate program, SLOs, and target courses.
 - Indicate the assessment strategy and when the assessment will occur (**Fall 2010 or Spring 2011**).
 - If any of your program SLOs were already assessed, include analysis of assessment results and plans for improvement of teaching and learning. Include overall results from program faculty dialogue (attach minutes from meeting as evidence).
 - If applicable, indicate which Institutional SLO (#1-5) the program SLO is linked to.

If your program offers more than one certificate, you will need to expand this chart to identify SLOs for each one. To do so, select the entire chart and press "Edit-Copy." Click in the blank space below the original chart and press "Edit-Paste."

NOT APPLICABLE: There is no certificate program in Chemistry

Certificate Program and SLO	Target Courses	Assessment Strategy & Timing	Results and Plans for Improvement (if applicable)	Related Institutional SLO (mark all that apply)
Name of Certificate Program:				
SLO 1:		<input type="checkbox"/> Fall 2010 <input type="checkbox"/> Spring 2011		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
SLO 2:		<input type="checkbox"/> Fall 2010 <input type="checkbox"/> Spring 2011		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
SLO 3:		<input type="checkbox"/> Fall 2010 <input type="checkbox"/> Spring 2011		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4

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			<input type="checkbox"/> 5
SLO 4:		<input type="checkbox"/> Fall 2010 <input type="checkbox"/> Spring 2011	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
SLO 5:		<input type="checkbox"/> Fall 2010 <input type="checkbox"/> Spring 2011	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5

5.3 How are course and/or program student learning outcomes communicated to students?

They are listed on course syllabi and can also be viewed on the college website.

5.3.1 How do you measure whether students understand what the outcomes mean?

Students' understanding the outcomes is measure through students' survey.

5.3.2 If applicable, how can students self-assess using rubrics, etc. in relation to the SLOs.

Not applicable

5.4 How will the results of assessment be used for planning and decision-making? How were the results discussed both internal and external to your program? Did students participate in the reviews of outcomes, criteria, curriculum design, or related activities? If so, describe.

A) The results of the assessment will be used in: 1) improving teaching and providing supplemental instruction to the students; 2) hiring an adequate number of tutors to accommodate all the students in the students in the program (there is currently only one tutor for CHEM 51, and there are no tutors for CHEM 101,102 and all organic chemistry courses); 3) getting all the necessary supplies to properly run the labs and correctly assess student learning (e.g., there is a shortage of burets and those available are in very poor conditions, should have at least one

buret per student to perform simple experiment such as Titration; the crucible available are very stained and in very poor conditions, students cannot get accurate results using these. Currently, there is only one Melt-Temp apparatus available for both organic chemistry courses, making it impossible to use it, at least one Melt-Temp per 2 students is needed); 4) addressing safety issues in lab (there is no phone and no fire extinguisher in any the lab where chemistry is currently taught); 5) scheduling chemistry courses in the Fall, Spring and Summer sessions to maintain a decent enrollment in the program courses and adequately feed other programs such as Nursing, and respond to students' needs; 6) ensuring that students have the minimum prerequisites before enrolling in a class.

B) Course SLO's were discussed among faculty teaching the appropriate courses. Program SLO's were generated in collaboration with faculty from other district colleges.

C) A students' survey is conducted to get input from the students in various areas.

Objective for Module Five

Write an objective, if applicable, to address future plans to develop, assess, and/or improve Student Learning Outcomes. List any objectives resulting from SLO assessment analysis. Objectives should be linked to the LASC [Strategic Planning Goals](#).

Objective	To improve Student Learning Outcomes in CHEM 51 and increase students' success rate
Planned Activities	<ol style="list-style-type: none"> 1) Organize more practice and discussion sessions in lab. 2) Provide additional homework to students. 3) Implement plans for improvement in Spring 2010 and Fall 2010 4) Ensure that adequate tutoring is available to the students 5) Ensure that students enrolled in the course have the basic math skills requirements or are concurrently enrolled in Math 115
Individual Responsible	P. Toure and G. Yoshida
Start Date	Spring 2010
Method of Evaluation	At least 70% of the students will score at least 70% on embedded assessments in midterm exams and final exam

Module Six: Student Feedback

6.0 Data collection

6.0.1 How many surveys were collected from students?

A total of 54 surveys were collected from the students enrolled in CHEM 51 courses, both day and evening classes.

6.0.2 How many students participated in focus groups?

None.

6.0.3 How many students participated in interviews?

None.

6.0.4 How many students participated in other activities in which students provided feedback to your program? Describe these activities.

None.

6.1 Describe the results of the data accumulated in the above methods.

In the survey students were asked to rate on the scales 1 to 5 (1= strongly disagree and 5=strongly agree) about their experiences in the overall program, faculty in the program, course in the program and facilities (equipment in classrooms and lab facilities, and program support services). The percentage of the students rating each of the following areas from 3 to 5 is summarized below:

A total of 94% (51/54) of the students for the overall program; 91% (49/54) of students for issues related to faculty in the program; 89 % (48/54) for issues related to courses in the program; and 69 % (37/54) of students for facilities in program.

The results of this survey are also applicable to other courses in the program. CHEM 51 is an introductory chemistry course, and materials and equipment used in CHEM 51 are also used in other advanced Chemistry courses in the program along with more sophisticated equipment.

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Objective for Module Six

Write an objective, if applicable, to address student feedback and concerns. Objectives should be linked to the LASC [Strategic Planning Goals](#).

Objective	To respond to the student concerns about students' services and availability of materials and supplies in the laboratory.
Planned Activities	<ul style="list-style-type: none">- Request additional funding to buy equipment such as burets, crucibles and thermometers to properly equip the laboratories to ensure that experiments are run smoothly- Request an additional tutor for CHEM 51 to increase interaction between tutor and students
Individual Responsible	P. Toure and G. Yoshida
Start Date	Fall'11
Method of Evaluation	Conduct a survey to get students' feedback. Increase the percentage of students rating the facilities on a scale 3 -5 in the program to at least 90%.

Module Seven: SWOC

Based on your program review, summarize:

Program Strengths

- 1) The program offers Introductory, General and Organic Chemistry courses. Students can take all the courses at the college when enrolled in the program
- 2) The program offers both day and evening courses in Introductory Chemistry, allowing students who work in the day to take evening classes (or vice versa)
- 3) The faculty in the program has a strong experience in teaching a variety of Chemistry courses.
- 4) The General and Organic Chemistry courses are transferrable to the CSU's and UC schools.
- 5) There is an excellent working relationship between faculty to promote and encourage students' success in the program.

Program Weaknesses

- 1) The program is not adequately funded to buy equipment and supply for the labs, and repair equipment that are not functioning properly.
- 2) Inadequate support services such as tutoring in all chemistry courses. Currently, there is only one tutor for CHEM 51 and no tutors for other CHEM 101, CHEM 102, CHEM 211 and CHEM 212. There is a need to hire an additional tutor for CHEM 51, and a tutor for each of the other chemistry courses.

Program Opportunities

Several opportunities are available to the students in the program:

- 1) CHEM 51 is a pre-requisite for nursing. After successful completion of this course, students may apply to continue with the nursing program
- 2) Students can transfer to 4-year college to pursue their education in Chemistry, biology or as pre-medicine, pre-pharmacy or pre-dental students
- 3) Several other career opportunities are as available such as lab technicians in biotech, environmental labs or service technicians in local pharmacies

Career opportunities for Chemists are often advertised by private, state and federal agencies (e.g., the Metropolitan Water District) in local newspapers such as the Los Angeles Times, or through various workshops around the state, or in magazines such Chemical and Engineering News from the American Chemical Society.

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Program Challenges

- 1) Working with students with very limited math or basic skills.
- 2) Teaching labs with a class size of over 30 students when 20-25 students is the size recommended by the American Chemical Society (ACS) guidelines.
- 3) Teaching classes with very limited student support services. Currently, there is only one tutor available for all CHEM 51 courses, and no tutor for other chemistry courses
- 4) The program currently has a very limited budget. Courses do not have all the equipment, supplies or materials needed to efficiently run the courses.
- 5) Teaching students of low-income families with multiple responsibilities, including but not limited to, being parents and having a very heavy workload that interfere with their class attendance, and their ability to study and focus on classroom activities

Module Eight: Objectives from 2008-2009 Mini-Review

8.0 List each of the objectives from your program’s 2008-2009 mini-review. (Click [here](#) to access the objectives from the mini-reviews.) Indicate the current status and outcome of each objective. (To add additional rows: Hit “Tab” at the end of the last row to add an additional blank row. Select the text and check boxes from the row above and press “Edit-Copy.” Click on the blank row and press “Edit-Paste”.)

Objective	Status Completed = C In Progress = IP Not Implemented = NI	Outcome If “C” evaluate the result If “IP” evaluate the status and plans for continuation of the objective If “NI” state whether the objective will be pushed to the next year of dropped entirely and the rationale behind the decision
1. Hire a full-time tenure track Chemistry	<input checked="" type="checkbox"/> Completed <input type="checkbox"/> In Progress <input type="checkbox"/> Not Implemented	
2. Request funding for lab supplies and equipment	<input type="checkbox"/> Completed <input checked="" type="checkbox"/> In Progress <input type="checkbox"/> Not Implemented	Although the chemistry program receives some funding for supplies and equipment, this budget is still insufficient to meet the demand of the program. More funding needs to be allocated to the program.
3. Increase retention rate by 2%.	<input type="checkbox"/> Completed <input checked="" type="checkbox"/> In Progress <input type="checkbox"/> Not Implemented	The overall percent retention increased by 1.6% from 2007-2008 to 2008-2009, but decreased by 6.7% from 2008-2009 to 2009-2010. The drop in retention may due to the fact that more advanced courses are now being offered in the program, and students often enroll in these courses without having the minimum requirements. A better percentage could be calculated based on the number of the students registered in the course after the census date. Prerequisites or corequisites of the students must be checked before they enrolled in the courses.

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Module Nine: 2010 Program Review Objectives

9.0 Rank and list all objectives that have been developed in this program review.

Rank	Objective	Planned Activities	Individual Responsible	Start Date	End Date
1	Hire an additional adjunct chemistry instructor and secure needed lab supplies to meet the high demand for CHEM 51 course and maintain an adequate average class size.	Request the offering of an additional Chem 51 course during the day and supply and equipment budget for chemistry	G. Yoshida	Fall'11	Spring'12
2	Hire a part-time Lab technician to assist evening lab instructors. A stockroom personnel must always be available any time lab is taught to assist the instructor in case of accident and when materials are needed to conduct the lab.	Request lab technician position from administration.	G. Yoshida	Spring'11	Fall'11
3.	Increase retention and success rate by 5% in all the Chemistry courses.	Ensure adequate tutoring is available to all students. Two tutors for Chem 51 and a tutor for each of the other advanced courses (CHEM 101, 102, 211 and 212)	G. Yoshida P. Toure	Fall'10	Spring'11
4.	Equip each chemistry lab with at least two fire extinguishers and a phone to be able to call 911 or campus police in case of an accident. These items are required for a chemistry lab as part of the safety protocol.	Ensure that adequate safety equipment is available in the laboratory.	G. Yoshida P. Toure	Fall'10	Spring'11

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5.	Equip the laboratory with a computer with internet capabilities to access chemistry websites and with softwares such as Chemdraw and PC spartan .	Ensure course is taught as indicated in the course outline of record	Glenn Yoshida	Fall'10	Spring'11
6.	Finalize AS Degree in Chemistry	Prepare final draft of new degree application and submit to Curriculum Committee.	P. Toure	Fall 2010	Fall 2012
7.	To improve student learning outcomes in CHEM 51 and students' success rate	<ul style="list-style-type: none"> -organize more practice problems in lab. - provide additional homework to students. - implement plans for improvement - Ensure that adequate tutoring Is available to students. -Ensure that students have the basic math requirements 	P. Toure	Spring 2010	Spring 2011
8.	Respond to the high demand of CHEM 51 class which is a pre-requisite to general chemistry and other related fields such as nursing and biology by being able to enroll all the students needing the course.	<ul style="list-style-type: none"> -Hire and additional adjunct instructor to teach the class - Request a budget to buy additional supplies and equipment to run the course. 	G. Yoshida	Fall 2011	Spring 2012

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9.	Respond to students' concerns about students' services and availability of materials and supplies in the laboratory	-Request additional funding to buy equipment such as burets, crucibles and thermometers to properly equip the laboratory to ensure that experiments are run smoothly.	G. Yoshida P. Toure	Fall 2011	Spring 2012
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Module Ten: Resource Priority Requests

Note: All resources requests must be linked to a program objective and to a [strategic plan goal/objective](#).

Rank	Resources Requested	Quantity /Units	Program Objective Number Related to this Request	Strategic Goal/Objective Number Related to this Request	Rationale for the Request	Anticipated Total Cost
1.	- Flame burners*	20	2	Goal #3, Goal #4 (Objective #3)	There should be at least one burner per pair of students. The burners must have rubber tubing. The burners are in a high number of experiments in Introductory and General Chemistry courses	\$2,063.46
2.	-gas-measuring burets*	25	2	Goal #3, Goal #4 (Objective #3)	Most of the burets currently PE 552 (#2142) available in the lab are in poor condition. There should be at one buret/student in lab, which is not currently case. Students have to work in groups for simple experiments such as Titration.	\$1937.53
	-25straight burets *	25	2			\$3412.99
3.	-crucibles high form*	3CS	2	Goal #3, Goal #4 (Objective #3)	Most of the crucibles currently available are severely stained and in poor condition. Accurate and reproducible data cannot be obtained using these damaged crucibles, making it very to assess the performance of the student	\$1029.29
	-crucible covers	1 CS	2			\$1425.27

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4.	Melting Point Apparatus	10	2	Goal #3, Goal #4 (Objective #3)	This equipment is commonly used in Organic Chemistry labs. It is used to determine the melting point of a compound and its purity	\$7110
5.	Microchemistry Kits	6	2	Goal #3, Goal #4 (Objective #3)	Each kit contains contain the glassware and any equipment needed to perform microscale experiments	\$1169.46
6.	Chemdraw Pro 11.0	1	2	Goal #3, Goal #4 (Objective #3)	A program used to draw the structure of organic molecules and determine their stability (listed in the course outline of record). A computer must be made available in the lab in order to use this software.	\$385.00
6.	Porcelain evaporating dish	2 CS	2	Goal #3, Goal #4 (Objective #3)	Evaporating dishes are used in several introductory and General Chemistry labs. There are currently available in the labs.	\$362.46

*prices included shipping and taxes

All prices are subject to change at the time of purchase

Concluding Comments and Recommendations

1. Discuss any special program accomplishments or achievements that have not already been addressed.

Dr. Toure has co-authored several papers on his research published in peer-reviewed journals sponsored by the American Chemical Society (ACS) and has contributed to several presentations at various ACS meetings around the country. A representative list of papers published by Dr. Toure is provided below:

- "Cobalt-Complexed Propargyl Cations: Generation under Neutral Conditions and Spontaneous, High-Temperature Conversion to Propargyl Radicals." Melikyan, G. G.; Sepanian, R.; Spencer, R.; Rowe, A.; **Toure, P.** *Organometallics* (2009) 28, 5541-5549.
- "High-Temperature Reaction of a Co₂(CO)₆-Complexed Propargyl Cation." Melikyan, G. G.; Mikailian, B.; Sepanian, R.; **Toure, P.** *J. Organomet. Chem.* (2009) 694, 785-794.
- "Intramolecular Radical Cyclizations of Co₂(CO)₆-Complexed Propargyl Radicals: Synthesis of d,l- and meso-1,5-Cyclodecadiynes." Melikyan, G. G.; Wild, C.; **Toure, P.** *Organometallics* (2008) 27, 1569-1581.
- "Cross-Coupling of Cobalt-Complexed Propargyl Radicals: Metal Core- and alpha- and gamma-Aryl-Induced Chemo- and Diastereoselectivity." Melikyan, G. G.; Floruti, A.; Devletyan, L.; **Toure, P.**; Dean, N.; Carlson, L. *Organometallics* (2007) 26(13), 3173-3182.
- "Tetrahydrofuran-Mediated Stereoselective Radical C-C Bond Formation in Dicobalthexacarbonyl-Propargyl Complexes." Melikyan, G. G.; Villena, F.; Floruti, A.; Sepanian, S.; Sarkissian, H.; Rowe, A.; **Toure, P.**; Mehta, D.; Christian, N.; Myer, S.; Miller, D.; Scanlon, S.; Porazik, M.; Gruselle, M. *Organometallics* (2006) 25, 4680-4690.
- "Thymidine 3',5'-Diphosphoric Acid Derived Cations and Radicals: Ab Initio Study," **Toure, P.**; Villena, F. and Melikyan, G. G. *Organic Letters* (2002) 4, 3989-3992.
- "Interaction of Propargyl Cation with Tetrahydrofuran: Thermodynamics, Kinetics, and Biological Relevance," **Toure, P.**; Myer, S. and Melikyan, G. G. *J. Phys. Chem. A* (2001) 105, 4579-4584.
- "Cobalt-Templated Radical Processes: Inter- and Intramolecular Coupling of Propargyl Radicals," Melikyan, G. G., Deravakian, A., Myer, S., Yadegar, S., Hardcastle, K. I., Ciurash, J. and **Toure, P.** *J. Organomet. Chem.* (1999) 578, 68-75.

In addition to faculty accomplishments, organic chemistry courses were also introduced in the department in 2005. Since then, CHEM 211 (Organic Chemistry I for majors) and CHEM 212 (Organic Chemistry II for Majors) have been offered in the fall and Spring semesters, respectively. New instruments including a Clarus 500 Gas Chromatograph and IR spectrometer were purchased for the Chemistry Program from Perkin Elmer Company.

2. Discuss anything else you would like to share about your program that has not already been addressed.

N/A

3. List minimum of (3) recommendations for the program.

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1. Hire an additional adjunct chemistry instructor to meet the high demand for CHEM 51 course and maintain an adequate average class size.
2. Hire a part-time Lab technician to assist evening lab instructors. A stockroom personnel must always be available any time lab is taught to assist the instructor in case of accident and when materials are needed to conduct the lab.
3. Increase retention and success rate in all the Chemistry courses.
4. Equip each chemistry lab with at least two fire extinguishers and a phone to be able to call 911 or campus police in case of an accident. These items are required for a chemistry lab as part of the safety protocol.
5. Equip the laboratory with a computer with internet capabilities to access chemistry websites and with software such as ChemDraw and PC spartan.