Chemistry
Instructional Program Review 2010-2011

Spring 2011

Prepared by

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Chemistry Program Review Committee Members

Name	Title
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PROGRAM REVIEW – Chemistry

The final summary of the program review process for Chemistry is attached to this page.

I affirm that this program has been reviewed according to the accepted District procedures for program review and that the final summary accurately reflects the consensus of the members of the review committee.

Eric Rabitoy, Dean of Natural and Physical Sciences	date
Michelle Plug, Articulation Officer	date
Carolyn Perry, Chair of Curriculum Committee	date
Irene Malmgren, Vice President of Academic Affairs	date
Nicki Shaw, Academic Senate President	date
Geraldine M. Perri, Superintendent/President	date

It will be the department's responsibility to communicate review recommendations with additional offices and services.

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1. Executive Summary

Program History/Description:

The two-year program in chemistry provides the student with a broad background in inorganic and organic chemistry and quantitative analysis. The program addresses both general education, as well as the needs of science and engineering majors, as well as those of students in the allied health areas.

The courses in this program serve three distinct populations, each with a different set of overall objectives and outcomes expectations. The courses in each of the three separate areas address the core institutional competencies: oral and written communication, computation, creative and analytical thought, global and community consciousness, and technology. The degree to which each of these competencies is emphasized varies according to the needs of the respective student population.

Strengths/Effective Practices

● The department has reviewed and updated all credit course outlines to reflect the SLO requirements as per current accreditation standards.
● The department has participated extensively in local outreach with K-12 districts.
● Courses are offered throughout the morning, evening, and afternoon and in such a manner to allow students to finish the program in two years.
● The department has increased course offerings in recent years to accommodate student need in pre-allied health and transfer coursework.
● Courses articulate with those at UC and CSU campuses.
● Labs have state-of-the-art computer and safety equipment for student use.
● Both student retention and success have increased over the last few years.
● The program conforms to the District's mission statement to provide transfer and degree courses.
●Student population in chemistry reflects District's diversity.

Weakneses/Lessons Learned

● The department does not have the facilities to offer additional laboratory sections and is, therefore, unable to expand course offerings.
● The air handlers in the Physical Science building do not efficiently remove fumes exhausted from the fume hoods. This causes a safety concern for both students and employees.

Recommendations/Next Steps

● Provide funding opportunities to hire a Chemistry Faculty Coordinator for Chem 103 and Chem 110

● Continue discussion with Facilities regarding the safety concerns associated with the existing fume hoods.
● Devise a long-range plan to provide additional lab space for chemistry courses.
● Pursue discussion of the SB 1440 transfer degree in Chemistry.

2. Faculty

Full-Time Faculty	Adjunct Faculty
Badieh Farahani	Donna Andrauskas
Terry Miles	Stephanie Dingwall
Dave Ryba	Allan Efron
	Robert Entus
	Martin Farnham
	Steven Han
	Kevin Johnson
	Joshua Junker
	Taiho Kim
	Hyun-Jin Ko
	Kurt Kupecz
	Cindy Li
	Robert Montgomery
	Gloria Ramos
	Prasanta Sharma
	Nathan Smyth
	Michael Torrez

3. Program description and mission

The two-year program in chemistry provides the student with a broad background in inorganic and organic chemistry and quantitative analysis. The program addresses both general education, as well as the needs of science and engineering majors, as well as those of students in the allied health areas.

The courses in this program serve three distinct populations, each with a different set of overall objectives and outcomes expectations. The courses in each of the three separate areas address the core institutional competencies: oral and written communication, computation, creative and analytical thought, global and community consciousness, and technology. The degree to which each of these competencies is emphasized varies according to the needs of the respective student population.

It is appropriate to say that all students in the program must develop and employ the ability to read and analyze information, synthesize information and reach logical conclusions, effectively communicate their results, and utilize the necessary computational skills to effectively conduct a scientific exercise or experiment and reach a

desired end. The students in the Chemistry Program will utilize a number of scientific instruments to acquire and analyze data and render the data in the form of a word-processed report or final written report.

4. Program Goals and Objectives

The goals and objectives of the Chemistry Program are:

a) Provide science and engineering transfer credit to four-year colleges and universities.

b) Meet the student learning outcomes and core competencies institutionalized by Citrus College.

c) Using experimental models, courses in the program will provide students with a basic understanding of general scientific concepts and specific chemical principles.

d) Prepare students to receive specific training in allied health programs such as nursing and physician's assistance.

e) Provide general education courses for students with either Associate Degree and/or transfer goals.

f) Provide classes that serve as prerequisites for other program areas on campus, especially those with a heavy emphasis on science and mathematics, i.e. engineering and pre-med.

5. Review of previous recommendations

The review of the recommendations presented in the 2004-2005 Chemistry Program Review are presented below:

*Previous Recommendation: Course outlines of record for all Chemistry courses should be revised and targeted to have all courses updated to include student learning outcomes language by the end of the Fall Semester 2006.
--Previous Recommendation Completed: All course SLOs are complete as of spring, 2009.

*Previous Recommendation: Organic Chemistry should be revised to a 5 unit course with 3 hours lecture, 1 hour of discussion, and 3 hours of laboratory.
--Previous Recommendation Pending: Currently under discussion within the department.

*Previous Recommendation: Revise the description of Chemistry 103 & 104; "College Chemistry" to "Allied Health" or "Life Science Chemistry".
--Previous Recommendation Completed: Faculty in the department are comfortable with current listing after having done research of course titles of similar courses used in surrounding institutions.

*Previous Recommendtion: Evaluate nursing or allied-health chemistry for appropriate pre-requisites and the impact of changing to a 5-unit combined Chemistry 103/104 course.
--Previous Recommendation Completed: Evaluation for pre-requisites has been completed. The department would like to keep Chemistry 103 and Chemistry 104 as separate courses.

*Previous Recommendation: Web pages for the discipline should be upgraded and "hit counters" should be employed to determine the degree to which they are accessed.
--Previous Recommendation Pending: Web pages have been upgraded, but hit counters have not been added. Further, some instructors have made extensive use of the campus Blackboard platform as a means of communications, data storage, and communication of assessment to the students. Blackboard does offer a hit counter that may be used to track student use.

*Previous Recommendation: Chemistry faculty should determine if there is a way to restrict access to the Success in Science course so that it serves its intended purpose as a safety net for students struggling in introductory science courses.
--Previous Recommendation Complete: The Success in Science course has been removed from the catalog.

*Previous Recommendation: Evaluate the impact of the Chemistry/Physics 106 offerings on enrollments in Chemistry 110.
--Previous Recommendation Complete: Chemistry 106 has not had an impact on Chemistry 110 enrollment as evidenced by the increased enrollment pattern in Chemistry 110 since 2005.

*Previous Recommendation: Continue to develop web pages for classes and specific instructors. It would be helpful to have more district support for web page design and maintenance. There is a large need to have "hit counters", something that MIS has said would be difficult to provide under our current structure.
--Previous Recommendation Pending: Need to continue dialogue with TeCS about the use of hit counters on web pages; however, hit counters exist on the Blackboard platform and may be used to track student activity if desired.

*Previous Recommendation: Need tracking information on Citrus graduates in order to follow their progress.
--Previous Recommendation Complete: The department has contacted the Office of Institutional Research to inquire as to whether or not this recommendation can be achieved. Long-term tracking of transfer student success is moderately successful using CPEC and CalPASS, but tracking to private schools is difficult to achieve.

*Previous Recommendtion: Need to develop a security system for record keeping insuring integrity of student work.

--Previous Recommendtion Pending: The department has made some use of Turnitin via Blackboard and directly from the company (Turnitin.com) to check for plagiarism, but this is not employed by all instructors, nor is it employed across the curriculum. In some cases, it would not be useful as the writing components do not involve use of word processing (non-electronic). The verification routine employed in house allows for some tracking, but is tedious. Need still exists to limit copying and other malfeasance.

*Previous Recommendation: Should evaluate the possibility of offering a summer GATE program for area elementary districts.
--Previous Recommendation Completed: This has been completed and the Chemistry Department has offered several workshops for GATE students from Glendora and Azusa Unified School Districts in the past several years. Existing demand continues, yet the department is in need of additional personel to facilitate.

*Previous Recommendation: Should Citrus consider hosting a science fair for area high schools similar to successful programs like that at Fullerton College?
--Previous Recommendation Pending: The Department has hosted a local science fair for Sellers Elementary school, but has not yet expanded to the high school.

*Previous Recommendation: Work with the counseling staff to develop academic "roadmaps" for students who will major in some aspect of science. Attend counseling department meetings in order to ensure that the counseling staff fully understands the appropriateness of specific chemistry courses for selected students.
--Previous Recommendation Pending: Chemistry faculty will continue to have discussions with Counseling faculty regarding this issue. With the development of articulated transfer degrees added to the program, this issue will be taken care of in part. However, dialogue still needs to continue with Counseling to provide guidance for students pursuing the paths of certificate and degree completion.

*Previous Recommendation: Consider using Chemistry 100 as a vehicle to focus a discussion among science faculty about the need for some minimal math competency for any general education science course.
--Previous Recommendation No Longer Applicable: Chemistry 100 is no longer offered and has been removed from catalogue.

*Previous Recommendation: Evaluate grant opportunities that might provide opportunities for program enhancement or that can serve as a means to provide outreach to our educational partners.
--Previous Recommendation Completed: The CCCRA STEM grant provided the opportunity to complete this recommendation. The department continues to examine other avenues for meeting this need.

*Previous Recommendation: Consider restricting software access to campus-only computer labs in order to improve the effectiveness of arranged hours for chemistry courses.

Previous Recommendation No Longer Applicable: Hours arranged have now been incorporated into assigned laboratory classroom time. Recommendation no longer applicable.

*Previous Recommendation: Increase the awareness of other Community Colleges and their programs. Plans are underway to have a fall 2005 meeting for area community college chemistry faculty.
Previous Recommendation Completed: Initial dialogue has been established. Not much dialogue with the full-time faculty at those institutions has been continued; however, several of our adjunct faculty members teach at neighboring schools and dialogue has been continuous with these individuals. As a result, Citrus Chemistry has a sense of how neighboring departments conduct business.

*Previous Recommendation: Make the ACS exam a more significant part of the final exam in Chemistry 110, 111, and 112.
--Previous Recommendation Completed: The ACS Exam is used in both Chemistry 111 and Chemistry 112 at the beginning and end of the semester as an assessment tool.

*Previous Recommendation: Reevaluate the ACS general chemistry format and possibly incorporate it into our program.
--Previous Recommendation Pending: Department facutly are currently evaluating the need to utilize the Chemistry Diagnostic Exam for Chemistry 110.

*Previous Recommendation: Evaluate the need for mathematics prerequisites for Chemistry 103 and 104 (Nursing Chemistry) and whether a combined 103/104 class would serve student needs or limit their options.
--Previous Recommendation Completed: Prerequisites have been deemed adequate. Courses articulate well with local and state transfer institutions and the need to implement a combined Chemistry 103/104 course is not useful to the majority of student on the pre-Nursing track.

*Previous Recommendation: Increase collaboration with the chemistry faculty from area CSU campuses.
--Previous Recommendation Completed: The STEM Program has opened up opportunities with the University of La Verne, Azusa Pacific University, and California State University, Fullerton in regard to this recommendation.

*Previous Recommendation: Develop a plan to test the effectiveness of student interactive devices (“clickers”) in chemistry lecture courses.
--Previous Recommendation Pending: Clickers have not yet been implemented in classroom. Dialogue between publishers and department will continue to address feasibility.

*Previous Recommendation: Be proactive in obtaining student internships from JPL.

--Previous Recommendation Incomplete: We currently have no lead in the department to serve as liaison to JPL. Need to reestablish contact.

*Previous Recommendation: Devise a plan for updating Course Outlines of Record in a timely fashion to keep the information on textbooks and the student learning outcomes expectations current.
--Previous Recommendation Pending: Discussions ongoing.

*Previous Recommendation: Reevaluate safety features for labs and stockroom (i.e. showers, doors) and air turnover rates and develop consistent guidelines for safety procedures in the laboratory.
--Previous Recommendation Pending: We have purchased first aid kits for all labs for minor injuries and the showers and eye washes are checked regularly for proper function. However, the fume hoods continue to be an issue and dialogue must continue with Facilities to help address the current air flow problem.

6. List and Review of Degrees, Certificates, and Awards

The Chemistry department does not provide a degree in Chemistry. However, the curriculum in the discipline is a part of the Biological and Physical Sciences (and Mathematics) Associates Degree. Courses in the Biological and Physical Sciences (and Mathematics) major examine the physical universe, its life forms, and its natural phenomena. They assist in developing an appreciation and understanding of the scientific method and encourage an understanding of the relationships between science and other human activities. This category includes introductory or integrative courses in astronomy, biology, chemistry, geology, physics, physical geography, and other scientific disciplines.

This degree requires meeting the Citrus College General Education and proficiency requirements combined with successful completion (grades of "C" and above) of the following major requirements:

18 Units from the courses listed below:

Course	Title	Units
ASTRONOMY		
ASTR 115	Planetary Astronomy	3
ASTR 115H	Planetary Astronomy - Honors	3
ASTR 116	Stellar Astronomy	4
ASTR 117	Life In The Universe	3
BIOLOGY		
BIOL 100	Introductory Biology	3
BIOL 102	Human Genetics	3
BIOL 104	Biology: Contemporary Topics	3
BIOL 105	General Biology	4
BIOL 109	Biology for Educators	4
BIOL 116	HIV and AIDS: Insights and Implications	3
BIOL 124	Principles of Biology I	5

Course	Title	Units
BIOL 125	Principles of Biology II	5
BIOL 145	Environmental Science	3
BIOL 200	Human Anatomy	4
BIOL 201	Human Physiology	4
BIOL 220	Microbiology	5
CHEMISTRY		
CHEM 103	College Chemistry	5
CHEM 104	College Chemistry	5
CHEM 106	Physical Science for Educators	4
CHEM 110	Beginning General Chemistry	5
CHEM 111	General Chemistry	5
CHEM 112	General Chemistry	5
CHEM 210	Organic Chemistry	3
CHEM 211L	Organic Chemistry Laboratory	1
CHEM 220	Organic Chemistry	3
CHEM 221L	Organic Chemistry Laboratory	1
COMPUTER SCIENCE & INFORMATION SYSTEMS		
CSIS 105	Introduction to Windows and Personal Computers	2
CSIS 107	Fundamentals of Information Technology	4
CSIS 111	Introduction to Programming Concepts and Design	4
CSIS 119	Introduction to Web Programming	3
CSIS 130	Microcomputer Applications I	4
CSIS 141	Java Script	4
CSIS 150	Web Development with Dreamweaver	3
CSIS 154	Web Development with Fireworks	2
CSIS 156	Web Development with Flash	2
CSIS 162	Electronic Spreadsheets Using Microsoft Excel	3
CSIS 166	Introduction of PowerPoint	2
CSIS 167	Introduction to MS Publisher	2
CSIS 168	Designing Web Sites	3
CSIS 175	Introduction to Access	2
CSIS 181	Introduction to Microsoft Project Management	2
CSIS 190	Introduction to Flash Game Programming	4
CSIS 225	Object Oriented Programming with C++	4
CSIS 230	Microcomputer Applications II	4
EARTH SCIENCE		
ESCI 106	Earth and Space Science for Educators	4
ESCI 118	Physical Geography	3
ESCI 120	Physical Geology	4
ESCI 121	Historical Geology	4
ESCI 122	Geology: Earth History	3
ESCI 124	Environmental Geology	3
ESCI 125	California Geology	4
ESCI 140	The Geology of Death Valley National Park	2
ESCI 141	The Geology of Yosemite National Park	2
ESCI 142	The Geology of Channel Islands National Park	2
ESCI 143	The Geology of Joshua Tree National Park	2
ESCI 145	The Geology of Sequoia National Park	2
ESCI 146	The Geology of Kings Canyon National Park	2

Course	Title	Units
ENGINEERING		
TECH 100	Principles of Technology	3
IT 104	PC Hardware and Maintenance	4
IT 107	Network Technology	4
IT 108	Networking Operating Systems	4
IT 109	Network and Computer Security	4
FORESTRY		
FOR 101	Introduction to Forestry	3
FOR 102	Introduction to Forest Ecology	3
FOR 103	Plant Identification	3
FOR 104	Introduction to Outdoor Recreation	3
FOR 105	Wildland Fire Management	3
FOR 106	Principles of Wildlife Management and Ecology	3
MATHEMATICS		
MATH 148	Intermediate Algebra I	2.5
MATH 149	Intermediate Algebra II	2.5
MATH 150	Intermediate Algebra	5
MATH 151	Plane Trigonometry	4
MATH 160	Survey of Mathematics	4
MATH 162	Introductory Mathematical Analysis	4
MATH 165	Introductory Statistics	4
MATH 165H	Introductory Statistics - Honors	4
MATH 168	Mathematics for Elementary Teachers I	4
MATH 169	Mathematics for Elementary Teachers II	4
MATH 170	College Algebra	3
MATH 175	Pre-Calculus	4
MATH 190	Calculus with Analytic Geometry I	4
MATH 191	Calculus with Analytic Geometry II	4
MATH 210	Calculus with Analytic Geometry III	4
MATH 211	Differential Equations	4
MATH 212	Introduction to Linear Algebra	4
NATURAL HISTORY		
NAT 180A	Natural History Series - Deserts A	2
NAT 180B	Natural History Series - Deserts B	3
NAT 181A	Natural History Series - Coastal Mountains, Coastlines, Tropical Regions and Islands A	2
NAT 181B	Natural History Series - Coastal Mountains, Coastlines, Tropical Regions and Islands B	3
NAT 182A	Natural History Series - Inland Mountains, Valleys and Alaska A	2
NAT 182B	Natural History Series - Inland Mountains, Valleys and Alaska B	3
OCEANOGRAPHY		
ESCI 130	Physical Oceanography	3

Course	Title	Units
PHYSICS		
PHYS 105	Physical Science	3
PHYS 106	Physical Science for Educators	4
PHYS 110	Introduction to College Physics	4
PHYS 111	Physics for Life Sciences I	4
PHYS 112	Physics for Life Sciences II	4
PHYS 201	Physics: Mechanics	5
PHYS 202	Physics: Electromagnetism	5
PHYS 203	Physics: Optics and Thermodynamics	5
Additional acceptable course under A.S. Natural Sciences:		
PHILOSOPHY		
PHIL 110	Philosophy/Logic	3

Degree or Certificate Title	Date last reviewed by Curriculum	Average number of awards each year	Date degree SLOs written	Date degree SLOs Assessed	Date last reviewed by Advisory Council
Biological and Physical Sciences (and Mathematics)	SP 2009	130	SLO's not written	SLO's not assessed	N/A

Certificates and/or awards awarded by the program:

none

7. List of Industry-Based Standard Certificates and Licenses

None

8. Advisory Committee or Council

Not applicable

9. Program Student Learning Outcomes

The Chemistry Program has adopted the Institutional General Education Competencies of Citrus College (as approved by Steering December 8, 2008). General education competencies serve as a common set of core curricular components identified and defined by faculty. Student learning outcomes are behaviors based on these competencies.

Any student transferring, completing a degree or certificate from Citrus College, must demonstrate effectively assessed awareness, understanding, knowledge, skills, and abilities in the selected competencies.
Students completing courses in the Chemistry Program will have acquired the following competencies:

1) Communication (personal expression and information acquisition)
Formulate knowledge of chemical processes for use in professional fields related to the discipline.
2) Computation
Classes offer basic knowledge of elements and the synthetic process of compounds as used in the chemistry discipline.
3) Creative, Critical, and Analytical Thinking, and Information Competency
Analyzing and understanding of relevant chemical processes as well as related sciences (biology and physics) and logically apply them to the professional disciplines.
4) Community/Global Consciousness and Responsibility

5) Technology
Utilizing the most current technological tools (computers, IR Spectroscopy) to assist in the study and development of processes related to the chemistry discipline.
6) Discipline / (Subject Area Specific Content Material)

10. Curriculum Review and Student Learning Outcomes Assessment

Curriculum/ SLO Assessment Map: CHEM

CC 1: Formulating knowledge in professional fields **CC 2: Basic Knowledge of Elements and Compounds**			**CC 3: Analyzing and Understanding Chemical Processes** **CC 4: Utilizing current technological tools**			
Course Applicability Key: T=Transfer, D=Degree, C=Certificate, S=Skill Award SLO Key: I=Introduced, D=Developed, M=Mastered						
	CC 1	**CC 2**	**CC 3**	**CC 4**		**Date of Assessment= FA10, SP12 or CA=(Ongoing, Continuing Assessment)**
CHEM 103–College Chemistry (5 Units), Applicability- T&D, Last Offered- Spring - 2011, Last Curriculum Date: 07/08						
SLO 1	I, D	I, D	I, D	I, D		Spring '10
SLO 2	I, D	I, D	I, D	I, D		Spring '10
SLO 3	I, D	I, D	I, D	I, D		Spring '10
SLO 4	I, D	I, D	I, D	I, D		Spring '10
CHEM 104–College Chemistry (5 Units), Applicability- T&D, Last Offered- Spring 2011, Last Curriculum Date: 07/08						
SLO 1	I, D	I, D	I, D	I, D		Fall '09
SLO 2	I, D	I, D	I, D	I, D		Fall '09
SLO 3	I, D	I, D	I, D	I, D		Fall '09
SLO 4	I, D	I, D	I, D	I, D		Fall '09
CHEM 106–Physical Science for Educators (4 Units), Applicability- T&D Last Offered Spring - 2011, Last Curriculum Date: 09/10						
SLO 1	I, D	I, D	I, D	I, D		Spring '11
SLO 2	I, D	I, D	I, D	I, D		Spring '11
SLO 3	I, D	I, D	I, D	I, D		Spring '11
SLO 4	I, D	I, D	I, D	I, D		Spring '11
SLO 5	I, D	I, D	I, D	I, D		Spring '11
SLO 6	I, D	I, D	I, D	I, D		Spring '11

CHEM 110–Beginning General Chemistry (5 Units), Applicability- T&D Last Offered- Spring 2011, Last Curriculum Date: 07/08							
SLO 1	I, D	I, D	I, D	I, D			CA
SLO 2	I, D	I, D	I, D	I, D			CA
SLO 3	I, D	I, D	I, D	I, D			CA
SLO 4	I, D	I, D	I, D	I, D			CA
SLO 5	I, D	I, D	I, D	I, D			CA
SLO 6	I, D	I, D	I, D	I, D			CA
CHEM 111–General Chemistry (5 Units), Applicability- T&D Last Offered- Spring 2011, Last Curriculum Date: 08/09							
SLO 1	D	D	D	D			CA
SLO 2	D	D	D	D			CA
SLO 3	D	D	D	D			CA
SLO 4	D	D	D	D			CA
SLO 5	D	D	D	D			CA
SLO 6	D	D	D	D			CA
CHEM 112–General Chemistry (5 Units), Applicability- T&D Last Offerred- Spring 2011, Last Curriculum Date: 08/09							
SLO 1	I	I	I	I			Spring '09
SLO 2	I	I	I	I			Spring '09
SLO 3	I	I	I	I			Spring '09
SLO 4	I	I	I	I			Spring '09
CHEM 210–Organic Chemistry (3 Units), Applicability- T&D Last Offered- Fall 2010, Last Curriculum Date: 07/08							
SLO 1	M	M	M	M			Fall '10
SLO 2	M	M	M	M			Fall '10
SLO 3	M	M	M	M			Fall '10
CHEM 211–Organic Chemistry Laboratory (1 Units), Applicability- T&D Last Offered- Fall 2010, Last Curriculum Date: 09/10							
SLO 1	M	M	M	M			Fall '10
SLO 2	M	M	M	M			Fall '10
SLO 3	M	M	M	M			Fall '10
SLO 4	M	M	M	M			Fall '10

CHEM 220–Organic Chemistry (3 Units), Applicability- T&D Last Offered- Spring 2011, Last Curriculum Date: 07/08							
SLO 1	M	M	M	M			CA
SLO 2	M	M	M	M			CA
SLO 3	M	M	M	M			CA
CHEM 221–Organic Chemistry Laboratory (3 Units), Applicability- T&D Last Offered- Spring 2011, Last Curriculum Date: 07/08							
SLO 1	M	M	M	M			CA
SLO 2	M	M	M	M			CA
SLO 3	M	M	M	M			CA

Curriculum/SLO Assessment Map

Chemistry Program

Course Number	Course Name	Last Reviewed by Curriculum Committee	*Date for next revision (six year cycle)	Date Last Offered	**Most Recent SLO's Assessed
CHEM 103	College Chemistry	June, 2008	Spring '14	Spring '11	See Matrix
CHEM 104	College Chemistry	Nov, 2007	Fall '13	Spring '11	"
CHEM 106	Physical Science for Educators	Apr, 2011	Spring '17	Spring '11	"
CHEM 110	Beginning General Chemistry	Apr, 2008	Spring '14	Spring '11	"
CHEM 111	General Chemistry	Dec, 2008	Fall '14	Spring '11	"
CHEM 112	General Chemistry	May, 2009	Spring '15	Spring '11	"
CHEM 210	Organic Chemistry	Dec, 2007	Fall '13	Fall '10	"
CHEM211L	Organic Chemistry Laboratory	Dec, 2009	Fall '15	Fall '10	"
CHEM 220	Organic Chemistry	March, 2008	Spring '14	Spring '11	"
CHEM221L	Organic Chemistry Laboratory	Dec, 2009	Fall '15	Spring '11	"

11. Evaluation Criteria – Need

Commendations:

•Courses are offered in a manner that allows students to finish the program in two years.

•The program has significantly increased its offerings of Chemistry 103 and 104 to meet the needs of rising demand in health science occupations. As an example, we currently offer 3 sections of Chemistry 103 each semester of the academic year as opposed to the 1 or 2 sections we used to offer in the last six-year cycle.

•The program has expanded its offerings of Chemistry 111 to include summer intersession. We believe this action has helped remedy low enrollment problems previously observed in Chemistry 112 and assisted in increasing transfer rate.

•We have successfully brought our Chemistry 112 offering back to 2 lab sections per semester. This course is usually still full by census.

Recommendations:

•Need tracking information on Citrus graduates in order to follow their progress. This may involve inquiries to our primary transfer institutions.

•We have been successful implementing workshops for elementary and middle school age GATE students attending schools within the District; however, the staffing required to offer these workshops on a regular basis has been limited if the program is run by full-time faculty. We have a need to seek either adjunct faculty or outside staff to run this program if we expect future success.

•Work with the counseling staff to develop academic "roadmaps" for students who will major in some aspect of science. Attend Counseling department meetings in order to ensure that the counseling staff fully understands the appropriateness of specific chemistry courses for selected students.

12. Evaluation Criteria – Quality

Commendations:

•Courses articulate with those at UC and CSU campuses.

•The faculty have developed grading standards, critical thinking methodologies, problem solving and written assignments consistent with college-level work.

•Labs have state-of-the-art computer and safety equipment for student use.

•The department has reviewed all credit course outlines and updated to reflect the SLO requirements as per current accreditation standards.

•Both student retention and success have increased marginally over the last three years of the six-year cycle for the contract year, however, both of these metrics have either stabilized or declined in the Winter and Summer intersession over the same time period. It is not clear why the intersessions have followed a different trend at this point.

Recommendations:

•Examine the introduction of ACS standardized examination to Chemistry 110.

•Be proactive in obtaining student internships from JPL. We currently have no lead in the department to serve as liaison to JPL, and we need to reestablish contact.

•Devise a plan for updating Course Outlines of Record in a timely fashion to keep the information on textbooks and the student learning outcomes expectations current.

13. Evaluation Criteria – Feasibility

Commendations:

•The Chemistry faculty members are among campus leaders in incorporating technology into their instructional program.

•The department uses computer applications in traditional chemistry labs.

•More sections offered in Chemistry 103, 104, 110, and 111; however, limitations due to space place restrictions on further growth.

*Chemistry courses are offered throughout the morning, afternoon, and evening, which provides an opportunity for students with diverse schedules to enroll in courses.

Recommendations:

•Dialogue with Facilities regarding fume hood exhaust need to continue until the problem is solved.

•The department is at capacity in terms of laboratory FTES. To continue to grow, we need additional lab space so that more sections of lab may be run.

•Need to have a permanent coordinator position for courses with multiple sections and instructors. Chemistry 110 and Chemistry 103 currently have a faculty member doing this on a voluntary basis. As this work is an additional burden on the faculty, we are requesting a stipend for the individual(s) doing this valuable work.

14. Evaluation Criteria – Compliance

Compliance:

*Facilities meet ADA and OSHA requirements

*Specific instructional efforts have been completed to serve students with disabilities in the chemistry laboratory rooms.

15. Evaluation Criteria – Other

Mission

Commendations:

•The program conforms to the District's mission statement to provide transfer and degree courses.

•Course numbering follows a logical pattern.

•Prerequisites are consistent with our transfer institutions.

•Student population in chemistry reflects District's diversity.

•The FTES/FTEF ratio has increased over the last 3 years of the current six-year cycle. One cannot compare this with campus data yet as the last two years are missing from the latest campus-wide report.

Recommendations:

•The department would like to investigate costs of contracting out a computer programmer to customize and update our outdated "verification" computation routine. Since this routine is used across the curriculum, it would be appropriate to invest resources to updating the hardware supporting the routine as well.

•Implement the transfer degree in Chemistry as per the agreement with the CSU system. Be mindful of UC and other transfer institution requirements in so doing.

16. Recommendations

Rank	Description of recommendation (actions or behaviors to be completed)	Responsible person(s)	Target Date	Personnel	Facilities	Equip. / Software	Supplies
1	Chemistry Faculty Coordinator	Faculty/Dean	Fa '11	☒	☐	☐	☐
2	Fume Hood Analysis	Dean	Fa '11	☐	☒	☐	☐
3	Additional Lab Space	Faculty/Dean	Fa '11	☐	☒	☐	☐
4	SB 1440 Degree	Faculty	Fa '12	☐	☐	☐	☐
5	Computer Programmer	Faculty/Dean	Sp '12	☒	☐	☒	☐
6	Curriculum Development Plan	Faculty	Fall '13	☐	☐	☐	☐
7	Student Tracking Information	Dean	Sp '13	☐	☐	☐	☐
8	JPL Internships	Faculty/Dean	Fall '13	☐	☐	☐	☐
9	ACS Exam in Chem110	Faculty	Sp '12	☐	☐	☐	☐
10	Academic Roadmap	Faculty/Dean	Fall '14	☐	☐	☐	☐
11	GATE Workshop	Faculty/Dean	Sp '12	☐	☐	☐	☐

17. Budget Recommendations

Resources are needed in the following areas:

Certificated Personnel (FNIC)

Position	Discuss impact on goals / SLOs	Impact ◊	Priority ‡
Chemistry Faculty Coordinator	Enhancement of student learning.	Q	B

Classified Personnel

Position	Discuss impact on goals / SLOs	Impact ◊	Priority ‡

Facilities

Facilities / repairs or modifications needed	Discuss impact on goals / SLOs	Bldg / Room	Impact ◊	Priority ‡
Fume Hood Evaluation	Maintenance of safety in the building for students and employees	PS	C	A
Additional lab space	Enhancement of our ability to serve students intending on pursuing a career in the allied health field and/or transfering to a 4-year institution	PS	N, F	B

Computers / Software (Tecs)

Item	Discuss impact on goals / SLOs	Cost	Impact ◊	Priority ‡
Computer Programming	Customization of existing verification system will facilitate student success and faculty members ability to assess student work.	$20,000	Q	B
Student Tracking	Enhancement of faculty members ability to assess student learning and evaluate course and program SLO's.	$20,000	Q	B

Equipment

Item	Discuss impact on goals / SLOs	Cost	Impact ◊	Priority ‡

Supplies (Division)

Item	Discuss impact on goals / SLOs	Cost	Impact ◊	Priority ‡

Additional information:

◊ **Impact:**
M = Mission: Does program meet the District's mission and established core competencies? Does program reflect the District's diversity?
N = Need: How is program addressing needs based on labor market data, enrollment, articulation, advisory committee, regional agreements, etc.?
Q = Quality: Are lecture/lab unit values appropriate? Have the course outlines been reviewed / updated regularly? Are disciplines appropriate? Is faculty development adequate? Does program support State and District emphasis on critical thinking, problem solving and written expression? Does program meet stated objectives in the form of SLOs? Are course pre-requisites and co-requisites validated?
F = Feasibility: Are facilities, equipment, and library resources adequate? Are evening programs and services adequate? Are course offerings frequent enough for students to make adequate progress in both day and evening programs? Does the program have adequate communication with & support from Counseling?
C = Compliance: Do course requisites meet Federal, State & District requirements? Do the course outlines meet state, district & federal regulations for content? Do vocational programs have regular advisory meetings?

‡ **Priority: (Note: When discussing priority, consider the following and address in Column 2)**
A. Is this goal mandated by law, rule, or district policy?
B. Is this goal essential to program success?
C. Is this goal necessary to maintain / improve program student learning outcomes?

Attachment A: Key Performance Indicator data pages

	Key Performance Indicators	Fall04	Fall05	Fall06	Fall07	Fall08	Fall09
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Program Access						
1	Majors (total)						
2	New Majors						
3	Courses Offered	6.0	7.0	8.0	9.0	8.0	8.0
4	Sections Offered	16.0	17.0	19.0	21.0	20.0	20.0
5	Morning Secions	7.0	7.0	7.0	14.0	12.0	12.0
6	Afternoon Sections	8.0	9.0	10.0	3.0	4.0	4.0
7	Evening Sections	1.0	1.0	2.0	4.0	4.0	4.0
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections	0.0	0.0	0.0	0.0	0.0	0.0
11	DistanceEd Full-Term Sections	0.0	0.0	0.0	0.0	0.0	0.0
12	DistanceEd Short-Term Sections						
13	Enrollment	264	270	318	346	340	378
14	Weekly Student Contact hours (WSCH)	3864.6	4001.7	4192.1	2551.1	3315.6	3625.1
15	Full-Time Equivalent Students (FTES)	132.5	137.2	143.7	78.7	102.3	111.9
	Program Resources						
16	Full-Time Equivalent Faculty (FTEF)	7.7	8.0	8.9	6.0	7.2	7.2
17	Credit Reimbursement Rate	**$2,922.30**	**$3,259.71**	**$3,476.34**	**$3,668.28**	**$3,834.46**	**$3,834.46**
	Program Operation						
18	WSCH/FTEF	503.9	500.8	473.2	422.4	458.6	504.2
19	FTES/FTEF	17.3	17.2	16.2	13.0	14.2	15.6
20	Fill Rate at Census	56.0	51.6	57.1	71.3	87.7	97.0
	Program Success						
21	Course Retention	86.7	89.3	87.7	87.9	96.8	95.0
22	Course Success	66.7	71.9	71.4	69.1	77.6	82.5

	Key Performance Indicators				Winter08	Winter09	Winter10
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Program Access						
1	Majors (total)						
2	New Majors						
3	Courses Offered				1.0	1.0	1.0
4	Sections Offered				1.0	2.0	2.0
5	Morning Secions				1.0	1.0	1.0
6	Afternoon Sections					1.0	1.0
7	Evening Sections						
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections				1.0	2.0	2.0
11	DistanceEd Full-Term Sections						
12	DistanceEd Short-Term Sections				0.0	0.0	0.0
13	Enrollment				26	53	55
14	Weekly Student Contact hours (WSCH)				203.5	444.6	527.6
15	Full-Time Equivalent Students (FTES)				6.3	13.7	16.3
	Program Resources						
16	Full-Time Equivalent Faculty (FTEF)				0.3	0.6	1.0
17	Credit Reimbursement Rate				**$3,668.28**	**$3,834.46**	**$3,834.46**
	Program Operation						
18	WSCH/FTEF				726.9	794.0	532.9
19	FTES/FTEF				22.4	24.5	16.4
20	Fill Rate at Census				108.3	110.4	110.4
	Program Success						
21	Course Retention				100.0	96.2	94.5
22	Course Success				92.3	84.9	89.1

	Key Performance Indicators	Spring05	Spring06	Spring07	Spring08	Spring09	Spring10
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Program Access						
1	Majors (total)						
2	New Majors						
3	Courses Offered	8.0	8.0	8.0	9.0	8.0	7.0
4	Sections Offered	17.0	17.0	22.0	21.0	20.0	20.0
5	Morning Secions	8.0	8.0	8.0	13.0	12.0	12.0
6	Afternoon Sections	7.0	8.0	13.0	4.0	4.0	4.0
7	Evening Sections	1.0	1.0	1.0	4.0	4.0	4.0
8	Arranged Sections	1.0					
9	Weekend Sections						
10	Short Term Sections	0.0	0.0	0.0	0.0	0.0	0.0
11	DistanceEd Full-Term Sections	0.0	0.0	0.0	0.0	0.0	0.0
12	DistanceEd Short-Term Sections						
13	Enrollment	257	276	323	351	371	378
14	Weekly Student Contact hours (WSCH)	3797.5	4033.8	4517.9	2834.0	3609.5	3744.4
15	Full-Time Equivalent Students (FTES)	130.2	138.3	154.9	87.5	111.4	115.5
	Program Resources						
16	Full-Time Equivalent Faculty (FTEF)	7.7	8.0	10.1	6.5	7.2	6.9
17	Credit Reimbursement Rate	**$2,922.30**	**$3,259.71**	**$3,476.34**	**$3,668.28**	**$3,834.46**	**$3,834.46**
	Program Operation						
18	WSCH/FTEF	495.1	504.8	449.5	436.0	502.7	541.9
19	FTES/FTEF	17.0	17.3	15.4	13.5	15.5	16.7
20	Fill Rate at Census	49.1	48.1	45.4	77.9	94.1	92.5
	Program Success						
21	Course Retention	89.5	90.6	93.2	91.5	93.0	89.7
22	Course Success	70.0	77.2	71.2	74.1	73.6	74.6

	Key Performance Indicators	Summer04	Summer05	Summer06	Summer07	Summer08	Summer09
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Program Access						
1	Majors (total)						
2	New Majors						
3	Courses Offered		1.0	2.0	2.0	3.0	3.0
4	Sections Offered		1.0	2.0	2.0	7.0	7.0
5	Morning Secions		1.0	2.0	2.0	5.0	5.0
6	Afternoon Sections					2.0	2.0
7	Evening Sections						
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections		1.0	2.0	2.0	7.0	7.0
11	DistanceEd Full-Term Sections						
12	DistanceEd Short-Term Sections		0.0	0.0	0.0	0.0	0.0
13	Enrollment		23	50	48	100	101
14	Weekly Student Contact hours (WSCH)	0.0	176.5	338.9	366.3	870.5	1048.4
15	Full-Time Equivalent Students (FTES)		6.1	11.6	12.6	26.9	32.4
	Program Resources						
16	Full-Time Equivalent Faculty (FTEF)		0.3	0.6	0.6	1.7	2.0
17	Credit Reimbursement Rate	**$2,922.30**	**$3,259.71**	**$3,476.34**	**$3,668.28**	**$3,834.46**	**$3,834.46**
	Program Operation						
18	WSCH/FTEF		630.2	605.2	654.2	515.1	524.2
19	FTES/FTEF		21.6	20.8	22.4	15.9	16.2
20	Fill Rate at Census		103.3	130.8	84.6	104.2	98.8
	Program Success						
21	Course Retention		91.3	90.0	93.8	100.0	89.1
22	Course Success		69.6	84.0	91.7	92.0	72.3

			04-05		05-06		06-07		07-08		08-09		09-10	
			Year1		Year2		Year3		Year4		Year5		Year6	
Gender														
	CHEM	Female	236	59.0%	257	57.2%	318	58.1%	389	58.9%	426	57.6%	409	54.1%
	CHEM	Male	164	41.0%	192	42.8%	229	41.9%	269	40.7%	295	39.9%	328	43.4%
	CHEM	Missing							3	0.5%	19	2.6%	19	2.5%
	CHEM	Total	400	100.0%	449	100.0%	547	100.0%	661	100.0%	740	100.0%	756	100.0%
Age														
	CHEM	19 or younger	118	29.5%	121	26.9%	150	27.4%	171	25.9%	224	30.3%	189	25.0%
	CHEM	20-24	190	47.5%	242	53.9%	286	52.3%	343	51.9%	334	45.1%	391	51.7%
	CHEM	25-29	54	13.5%	50	11.1%	63	11.5%	75	11.3%	99	13.4%	105	13.9%
	CHEM	30-34	16	4.0%	21	4.7%	20	3.7%	36	5.4%	39	5.3%	31	4.1%
	CHEM	35-39	9	2.3%	9	2.0%	11	2.0%	12	1.8%	15	2.0%	18	2.4%
	CHEM	40-49	13	3.3%	6	1.3%	12	2.2%	20	3.0%	26	3.5%	18	2.4%
	CHEM	50 and above					4	0.7%	3	0.5%	3	0.4%	4	0.5%
	CHEM	Missing					1	0.2%	1	0.2%				
	CHEM	Total	400	100.0%	449	100.0%	547	100.0%	661	100.0%	740	100.0%	756	100.0%
Ethnicity														
	CHEM	Asian	98	24.5%	111	24.7%	140	25.6%	120	18.2%	129	17.4%	88	11.6%
	CHEM	Black or African American	15	3.8%	21	4.7%	14	2.6%	19	2.9%	19	2.6%	15	2.0%
	CHEM	Hispanic/Latino	138	34.5%	157	35.0%	197	36.0%	261	39.5%	255	34.5%	221	29.2%
	CHEM	American Indian or Alaska Native			3	0.7%	3	0.5%	6	0.9%	4	0.5%	1	0.1%
	CHEM	Native Hawaiian or Other Pacific Islander							5	0.8%	4	0.5%	11	1.5%
	CHEM	White	123	30.8%	128	28.5%	161	29.4%	180	27.2%	197	26.6%	162	21.4%
	CHEM	Two or More Races											2	0.3%
	CHEM	Unknown/Non-Respondent	26	6.5%	29	6.5%	32	5.9%	70	10.6%	132	17.8%	256	33.9%
	CHEM	Total	400	100.0%	449	100.0%	547	100.0%	661	100.0%	740	100.0%	756	100.0%
Educational Goal														
	CHEM	Degree & Transfer	185	46.3%	203	45.2%	257	47.0%	68	10.3%	161	21.8%	276	36.5%
	CHEM	Transfer	133	33.3%	161	35.9%	191	34.9%	38	5.7%	76	10.3%	87	11.5%
	CHEM	AA/AS	8	2.0%	17	3.8%	16	2.9%	24	3.6%	74	10.0%	89	11.8%
	CHEM	License	23	5.8%	21	4.7%	21	3.8%	2	0.3%	7	0.9%	10	1.3%
	CHEM	Certificate	9	2.3%	17	3.8%	20	3.7%	3	0.5%	5	0.7%	7	0.9%
	CHEM	Job Skills	11	2.8%	5	1.1%	3	0.5%	22	3.3%	48	6.5%	52	6.9%
	CHEM	Basic Skills							19	2.9%	31	4.2%	17	2.2%
	CHEM	Personal											3	0.4%
	CHEM	Undecided							16	2.4%	49	6.6%	79	10.4%
	CHEM	Not Reported	31	7.8%	25	5.6%	39	7.1%	469	71.0%	289	39.1%	136	18.0%
	CHEM	Total	400	100.0%	449	100.0%	547	100.0%	661	100.0%	740	100.0%	756	100.0%

	Key Performance Indicators	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
		Year1	Year2	Year3	Year4	Year5	Year6
	Program Resources						
23	Revenue: FTES*Reimbursement Rate	$431,503.53	$532,245.45	$663,529.02	$412,388.04	$543,803.12	$559,371.02
24	Total District Adopted Program Budget	439,197	383,813	417,860	591,717	671,117	673,474
25	Support Personnel (wage without benefit, 2200 and 2400 in budget)	56,666	57,204	65,830	71,397	0	0
26	Supplies (4300 in budget)	18,549	14,805	27,222	15,016	32,219	31,219
27	Cost	434,474	381,826	510,227	559,183	681,344	
28	Total FTES for the year	147.76	163.28	190.87	112.42	141.82	145.88
29	Cost per FTES	$2,940.40	$2,338.47	$2,673.16	$4,974.05	$4,804.29	
	Degrees and Certificates						
30	Degree						
31	Certificates						
32	Skill Awards						
33	Licenses (reported by department)						
	Career Technical Education Programs						
34	VTEA Grant						
35	Industry Contributions to Program Resources						
36	Available Jobs						
37	Attach one copy of the three most recent College Core Indicator Information forms for each of the appropriate TOP codes						
38	Please include "Student Satisfaction" and "Employer Satisfaction" in the program review write-up.						
39	Labor market data						