

Chemistry Program Review

2011-2012

1. Program Description

A. Description

A comprehensive set of undergraduate courses fulfill the general education and transfer requirements of students through onsite as well as hybrid (online/onsite) offerings. Students may obtain an AA or AS in chemistry; both major requirements optimize preparation for advanced degrees in chemistry at four-year institutions. A background in chemistry is essential for many high-paying, challenging careers. Opportunities await the chemist in such fields as medicine and pharmaceuticals, metals and polymers, petroleum, electrochemistry, nanotechnology, forensics, aerospace, paper, food technology, business, and education.

B. *Program Student Learning Outcomes*

Successful graduates of the program are able to:

1. Apply the Scientific Method to analyze and interpret data in order to draw valid conclusions.
2. Communicate scientific ideas effectively in a logical and understandable manner, both verbally and in writing.
3. Relates observable macroscopic properties to underlying microscopic principles.
4. Demonstrates proficiency in current chemical laboratory safety and skills.

C. *College Level Student learning Outcomes*

1. Critical Thinking and Problem Solving
2. Communication
3. Information Competency

Estimated Costs (Two-Year Degree)

Enrollment Fees	
Books	
Tools	
Total	

Criteria Used for Admission

Students must meet prerequisites for individual courses.

Vision

Ventura College will be a model community college known for enhancing the lives and economic futures of its students and the community.

Mission

Ventura College, one of the oldest comprehensive community colleges in California, provides a positive and accessible learning environment that is responsive to the needs of a highly diverse student body through a varied selection of disciplines, learning approaches and teaching methods including traditional classroom instruction, distance education, experiential learning, and co-curricular activities. It offers courses in basic skills; programs for students seeking an associate degree, certificate or license for job placement and advancement; curricula for students planning to transfer; and training programs to meet worker and employee needs. It is a leader in providing instruction and support for students with

Chemistry Program Review

2011-2012

disabilities. With its commitment to workforce development in support of the State and region's economic viability, Ventura College takes pride in creating transfer, career technical and continuing education opportunities that promote success, develop students to their full potential, create lifelong learners, enhance personal growth and life enrichment and foster positive values for successful living and membership in a multicultural society. The College is committed to continual assessment of learning outcomes in order to maintain high quality courses and programs. Originally landscaped to be an arboretum, the College has a beautiful, park-like campus that serves as a vital community resource.

Core Commitments

Ventura College is dedicated to following a set of enduring Core Commitments that shall guide it through changing times and give rise to its Vision, Mission and Goals.

- Student Success
- Respect
- Integrity
- Quality
- Collegiality
- Access
- Innovation
- Diversity
- Service
- Collaboration
- Sustainability
- Continuous Improvement

Degrees/Certificates

History/Significant Unit Events

Two new chemistry professors have been hired to replace attrition over the last three years maintaining four full-time instructors and averaging five part-time instructors. The program has been the beneficiary of a STEM grant that provided high-technology analytical equipment used in General Chemistry and Organic Chemistry including; infrared spectrophotometer, two gas chromatographs, and atomic absorption spectrometer from program review. This instrumentation allows analysis of a wide-range of chemical compounds using the latest techniques. The chemistry program has surpassed the district 525 goal in FY11 by efficient scheduling and has success and retention rates above the college averages.

Organizational Structure

President: Robin Calote

Executive Vice President: Ramiro Sanchez

Dean: David Oliver

Instructors and Staff

Department Chair: Joe Selzler

Chemistry Program Review

2011-2012

Name	Joy Kobayashi
Classification	Professor
Year Hired	1985
Years of Work-Related Experience	
Degrees/Credentials	B.A., M.S.

Name	Michelle Hagerman
Classification	Associate Professor
Year Hired	2007
Years of Work-Related Experience	
Degrees/Credentials	B.S., M.S.

Name	Malia Rose
Classification	Assistant Professor
Year Hired	2009
Years of Work-Related Experience	
Degrees/Credentials	B.S., M.S.

Name	Joe Selzler
Classification	Professor
Year Hired	2004
Years of Work-Related Experience	
Degrees/Credentials	B.S., M.S.

Chemistry Program Review

2011-2012

2. Performance Expectations

Program Student Learning Outcomes

Successful graduates of the program are able to:

1. Apply the Scientific Method to analyze and interpret data in order to draw valid conclusions.
2. Communicate scientific ideas effectively in a logical and understandable manner, both verbally and in writing.
3. Relates observable macroscopic properties to underlying microscopic principles.
4. Demonstrates proficiency in current chemical laboratory safety and skills.

Student Success Outcomes

1. The program will maintain its retention rate at the average of the **program's** prior three-year retention rate. The retention rate is the number of students who finish a term with any grade other than W or DR divided by the number of students at census.
2. The program will continue to exceed the college's three-year average retention rate. The retention rate is the number of students who finish a term with any grade other than W or DR divided by the number of students at census.
3. The program will maintain the student success rates at the average of the **program's** prior three-year success rates. The student success rate is the percentage of students who receive a grade of c or better.
4. The program will exceed the college's three-year average student success rates. The student success rate is the percentage of students who receive a grade of C or better.

Program Operating Outcomes

1. The program will maintain WSCH/FTEF above the 525 goal set by the district.
2. Inventory of instructional equipment is functional, current, and otherwise adequate to maintain a quality-learning environment. Inventory of all equipment over \$200 will be maintained and a replacement schedule will be developed. Service contracts for equipment over \$5,000 will be budgeted if funds are available.
3. The Chemistry Program will continue to improve its curriculum and learning environment. The program should review curriculum and assess equipment needs including maintenance, to assure that student needs are being met.
4. The program will increase the full-time to part-time FTEF ratio of two-to-one or greater, approaching three-to-one goal of AB1725.

Chemistry Program Review

2011-2012

D. Courses to Student Learning Outcomes Map

1. Apply the Scientific Method to analyze and interpret data in order to draw valid conclusions.
2. Communicate scientific ideas effectively in a logical and understandable manner, both verbally and in writing.
3. Relates observable macroscopic properties to underlying microscopic principles.
4. Demonstrates proficiency in current chemical laboratory safety and skills.

Course to Program-Level Student Learning Outcome Mapping (CLSLO)

I: This program-level student learning outcome is **INTRODUCED** in this course.

P: This program-level student learning outcome is **PRACTICED** in this course.

M: This program-level student learning outcome is **MASTERED** in this course.

Leave blank if program-level student learning outcome is not addressed.

Courses	PLSLO #1	PLSLO #2	PLSLO #3	PLSLO #4	PLSLO #5	PLSLO #6	PLSLO #7	PLSLO #8
CHEM V01A	I	I,P	I,P					
CHEM V01AL	P,M	P,M	P,M	I,P,M				
CHEM V01B	P	P,M	P,M					
CHEM V01BL	P,M	P,M	P,M	P,M				
CHEM V05	P,M	M	M	M				
CHEM V12A	M	P,M	M					
CHEM V12AL	P,M	P,M	M	P,M				
CHEM V12B	M	M	M					
CHEM V12BL	P,M	M	M	P,M				
CHEM V20	I	I	I,P					
CHEM V20L	P	P	P	I,P				
CHEM V21	I	P	P					
CHEM V21L	P	P	P	I,P				
CHEM V30	I	P	P					
CHEM V30L	P	P	P	I,P				
CHEM V89	M	M	M					
CHEM V90	M	M	M					

Chemistry Program Review

2011-2012

3. Operating Information

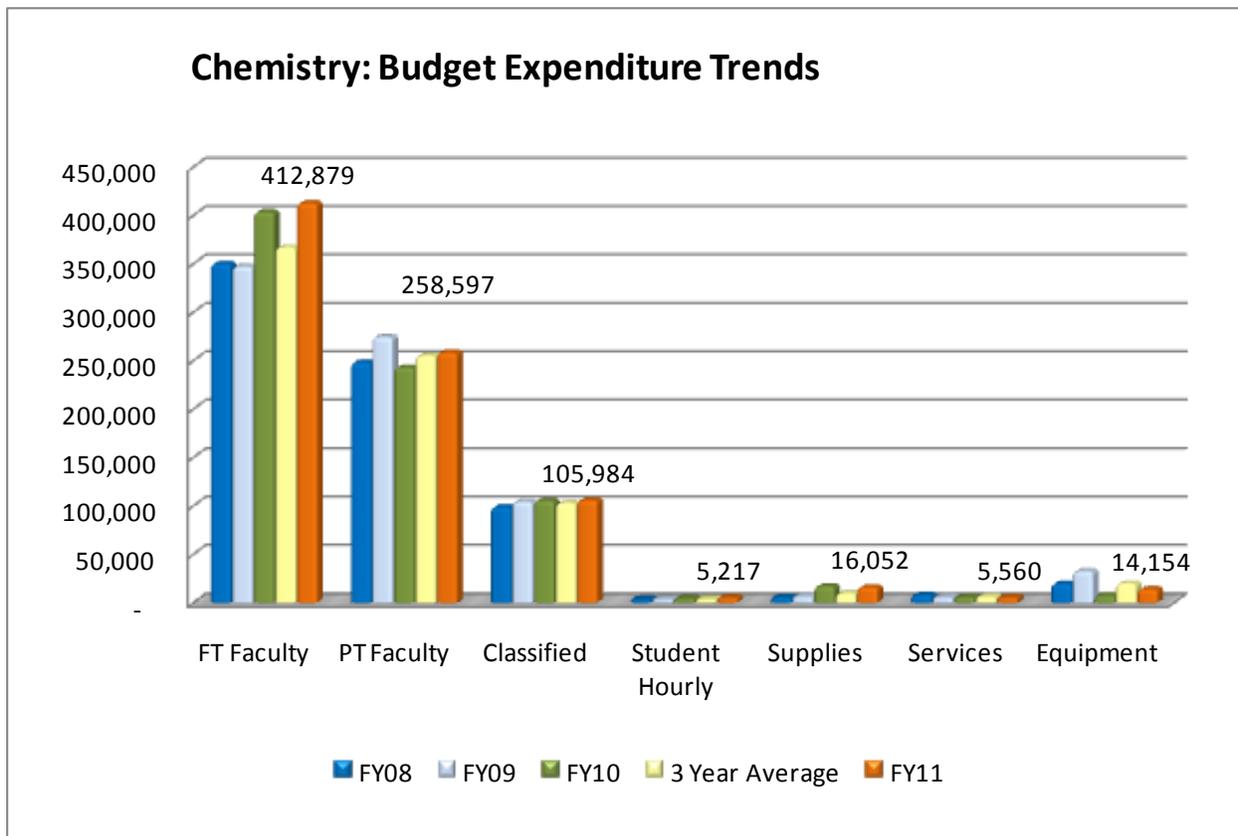
A1: Budget Summary Table

To simplify the reporting and analysis of the Banner budget detail report, the budget accounts were consolidated into nine expense categories. The personnel categories include employee payroll expenses (benefits). The “3 Year Average” was computed to provide a trend benchmark to compare the prior three year expenses to the FY11 expenses. The “FY11 College” expense percentages are included to provide a benchmark to compare the program’s expenses to the overall college expenses.

Category	Title	FY08	FY09	FY10	3 Year Average	FY11	FY11 Program	FY11 College
1	FT Faculty	350,285	347,413	403,564	367,087	412,879	12%	12%
2	PT Faculty	248,322	274,635	243,071	255,343	258,597	1%	-10%
3	Classified	99,028	104,474	105,505	103,002	105,984	3%	-1%
4	Student Hourly	3,609	3,997	4,350	3,985	5,217	31%	10%
7	Supplies	5,709	6,758	17,128	9,865	16,052	63%	7%
8	Services	7,962	5,886	5,917	6,588	5,560	-16%	-8%
9	Equipment	19,812	32,753	7,320	19,962	14,154	-29%	24%
	Total	734,727	775,916	786,855	765,833	818,443	7%	0%

A2: Budget Summary Chart

This chart illustrates the program’s expense trends. The data label identifies the FY11 expenses (the last bar in each group). The second-to-last bar is the program’s prior three year average.

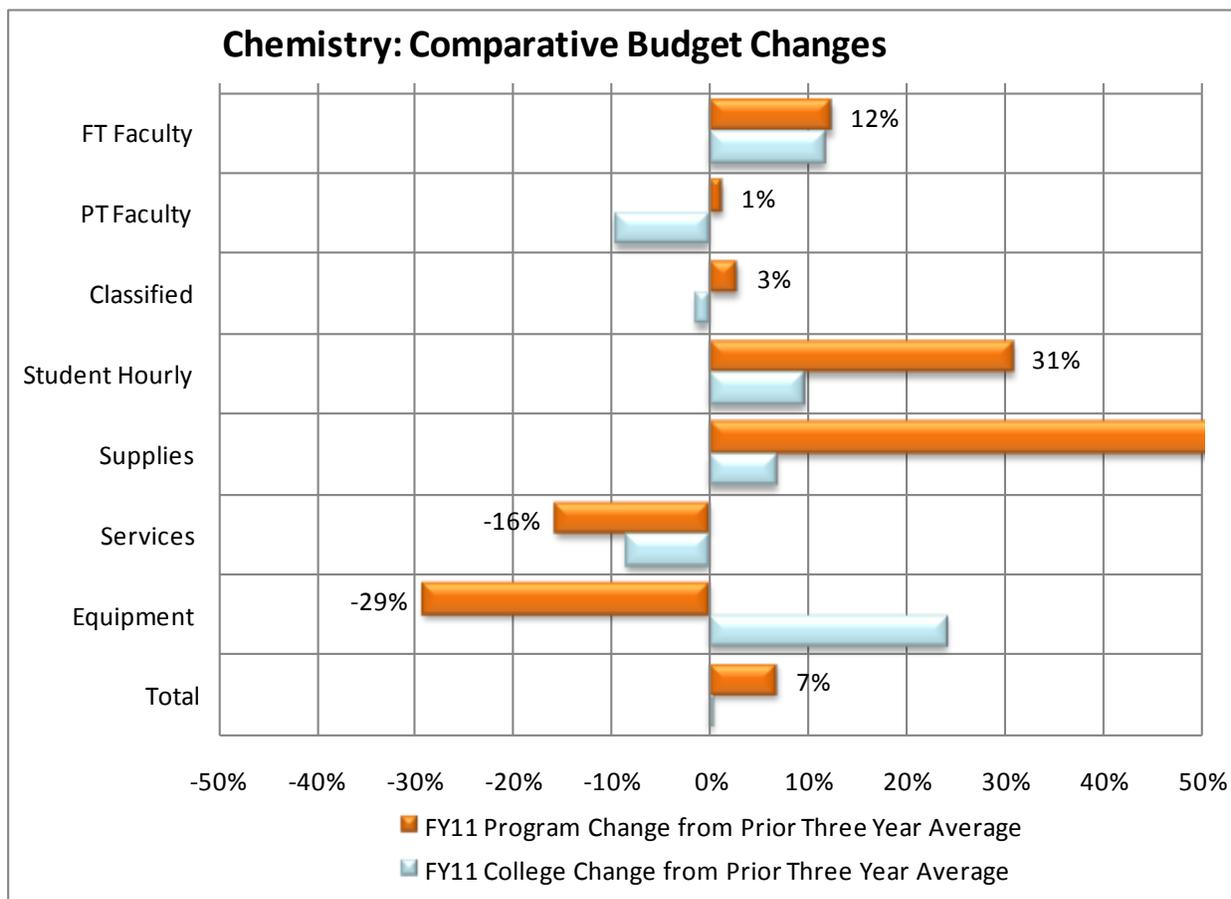


Chemistry Program Review

2011-2012

A3: Comparative Budget Changes Chart

This chart illustrates the percentage change from the prior three year average expense to the FY11 expenses. The top bar for each budget category represents the program's change in expenses and includes the data label. The second bar represents the college's change in expenses.



A4: Budget Detail Report

The program's detail budget information is available in *Appendix A – Program Review Budget Report*. This report is a PDF document and is searchable. The budget information was extracted from the District's Banner Financial System. The program budget includes all expenses associated to the program's Banner program codes within the following funds: general fund (111), designated college equipment fund (114-35012), State supplies and equipment funds (128xx), and the technology refresh fund (445). The *Program Review Budget Report* is sorted by program (in alphabetical order) and includes the following sections: total program expenses summary; subtotal program expenses for each different program code; detail expenses by fund, organization and account; and program inventory (as posted in Banner). To simplify the report, the Banner personnel benefit accounts (3xxx) were consolidated into employee type benefit accounts (3xxx1 = FT Faculty, 3xxx2 = PT Faculty, 3xxx3 = Classified, etc.).

Chemistry Program Review

2011-2012

A5: Interpretation of the Program Budget Information

The program shows a 15% increase in average FT faculty expenditures over the last three years paralleling the college average expenditures over the same period. Three factors account for this change; step and column increases, changes in release time, and increased full-time instructor loads. Increases in full-time expenditures correspond to the decrease in part-time expenditures which mirrors the college trends.

The supplies budget shows a 31% increase over the average of the past three years; however, FY08 and FY09 supplies reported in table 3.A1 do not reflect an additional \$10,000 from the physical science account. Taking this into account, the chemistry supply budget has remained relatively constant in spite of a 10% growth in students and inflationary pressures.

Equipment expenditures were markedly less in FY11 due to the ending of a two-year STEM grant that funded a major portion of the equipment needs in Chemistry during the years 2008-2010. In addition, consideration needs to be made for the maintenance of recently purchased equipment. The department often struggles to find funds to fix equipment when it breaks down.

Because of changes in laboratory curriculum, greater preparation time is needed, requiring greater laboratory technician assistance. Due to limited availability of unknown samples, students are unable to repeat experiments which they have not mastered. The department addresses this deficiency in one of our initiatives.

Chemistry Program Review 2011-2012

B1: Program Inventory Table

This chart shows the inventory (assets) as currently posted in the Banner Financial System. This inventory list is not complete and will require review by each program. Based on this review an updated inventory list will be maintained by the college. A result of developing a complete and accurate inventory list is to provide an adequate budget for equipment maintenance and replacement (total-cost-of-ownership). The college will be working on this later this fall.

Item	Vendor	Org	Fund	Purchased	Age	Price	Perm Inv #	Serial #
Insight 4 IN4/2202 OMR Scanner	Pearson Assess	32016	111	39461	3	4,136	N00018404	5205806
IntelP4 2.8Ghz Computer w/ VG	MAT 2000 Inc	32032	111	38145	7	1,333	N00011179	2.00041E+12
Infinity 1-1 Color Camera	McBain Instrume	32038	111	39902	2	1,060	N00018776	181388
Infinity 1-1 Color Camera	McBain Instrume	32038	111	39902	2	1,069	N00018775	181387
OptiPlex 745 Desktop, Core 2 Du	Dell Computer C	32038	111	39209	4	1,477	N00018209	8PVDSC1
Projector	Troxell Communi	32038	111	38903	5	996	N00011934	CP-X250
Projector	Troxell Communi	32038	111	38903	5	1,093	N00011933	F6D035745
Mitsubishi XL2U 1500 Lumens	Troxell Communi	32038	111	37664	8	2,561	N00003321	1002276
Mitsubishi XL2U 1500 Lumens	Troxell Communi	32038	111	37664	8	2,561	N00003320	1002378
Dell Inspiron 8200 P IV Laptop	Dell Computer C	32038	111	37405	9	3,890	N00003204	C11LH11
Tegrity 5.0 PC & Video Upgrade	Tegrity Inc	32038	111	37354	9	8,028	N00003084	E00P500
HP Scanjet N8420 Document Sca	Sehi Computers	32040	111	40287	1	1,008	N00018967	SCN98WA0150
HP Color LaserJet 3000N	Sehi Computers	32040	111	39260	4	1,134	N00018318	SCNYBL09235
HP Color LaserJet 3000N	Sehi Computers	32040	111	39260	4	1,134	N00018316	SCNYBL08412
HP Color LaserJet 3000N	Sehi Computers	32040	111	39260	4	1,134	N00018317	SCNYBL00660
HP Color LaserJet 3000DN Printe	Sehi Computers	32040	111	38880	5	1,417	N00011872	SCNR01774
HP LaserJet 4350TN Printer Q540	Sehi Computers	32040	111	38880	5	1,793	N00011873	SCNGXC28822
Latitude E6510, Genuine Windo	Dell Computer C	37010	121	40350	1	1,838	N00022103	MA2TPM
Sony VA10 Notebook with Mobi	Best Buy Compa	37065	122	37634	8	1,752	N00003212	8377430-3517993
Eclipse II custom 10x10 white to	Myezup.com	37110	126	39049	5	1,269	N00018050	0
Hand Held GPS	Trimble Navigati	38031	127	37551	9	3,389	N00003290	RPU 4238B12675
Hand Held GPS	Trimble Navigati	38031	127	37551	9	3,389	N00003291	RPU 4238B12697
Hand Held GPS	Trimble Navigati	38031	127	37551	9	3,389	N00003292	RPU 4238B1701
Hand Held GPS	Trimble Navigati	38031	127	37551	9	3,389	N00003293	RPU 04238B1704

B2: Interpretation of the Program Inventory Information

The equipment list provided by Banner is incomplete, contains numerous errors, and does not accurately reflect the program's holdings. An inventory is underway to provide an accurate equipment list. A quick survey of existing equipment shows that chemistry has nearly \$500,000 of equipment, approximately 40% of which was acquired through the STEM grant.

Chemistry Program Review

2011-2012

C1: Productivity Terminology Table

Sections	A credit or non-credit class. Does not include not-for-credit classes (community education).
Census	Number of students enrolled at census (typically the 4 th week of class for fall and spring).
FTES	Full Time Equivalent Students A student in the classroom 15 hours/week for 35 weeks (or two semesters) = 525 student contact hours. 525 student contact hours = 1 FTES. Example: 400 student contact hours = $400/525 = 0.762$ FTES. The State apportionment process and District allocation model both use FTES as the primary funding criterion.
FTEF	Full Time Equivalent Faculty A faculty member teaching 15 units for two semesters (30 units for the year) = 1 FTE. Example: a 6 unit assignment = $6/30 = 0.20$ FTEF (annual). The college also computes semester FTEF by changing the denominator to 15 units. However, in the program review data, all FTE is annual. FTEF includes both Full-Time Faculty and Part-Time Faculty. FTEF in this program review includes faculty assigned to teach extra large sections (XL Faculty). This deviates from the district practice of not including these assignments as part of FTEF. However, it is necessary to account for these assignments to properly produce represent faculty productivity and associated costs.
Cross Listed FTEF	FTEF is assigned to all faculty teaching cross-listed sections. The FTEF assignment is proportional to the number of students enrolled at census. This deviates from the practice of assigning load only to the primary section. It is necessary to account for these cross-listed assignments to properly represent faculty productivity and associated costs.
XL FTE	Extra Large FTE: This is the calculated assignment for faculty assigned to extra large sections (greater than 60 census enrollments). The current practice is not to assign FTE. Example: if census > 60, 50% of the section FTE assignment for each additional group of 25 (additional tiers).
WSCH	Weekly Student Contact Hours The term "WSCH" is used as a total for weekly student contact hours AND as the ratio of the total WSCH divided by assigned FTEF. Example: 20 sections of 40 students at census enrolled for 3 hours per week taught by 4.00 FTEF faculty. $(20 \times 40 \times 3) = 2,400$ WSCH / 4.00 FTEF = 600 WSCH/FTEF.
WSCH to FTES	Using the example above: $2,400$ WSCH x 35 weeks = 84,000 student contact hours = $84,000 / 525 = 160$ FTES (see FTES definition). Simplified Formulas: $FTES = WSCH/15$ or $WSCH = FTES \times 15$
District Goal	Program WSCH ratio goal. WSCH/FTEF The District goal was set in 2006 to recognize the differences in program productivity.

Chemistry Program Review

2011-2012

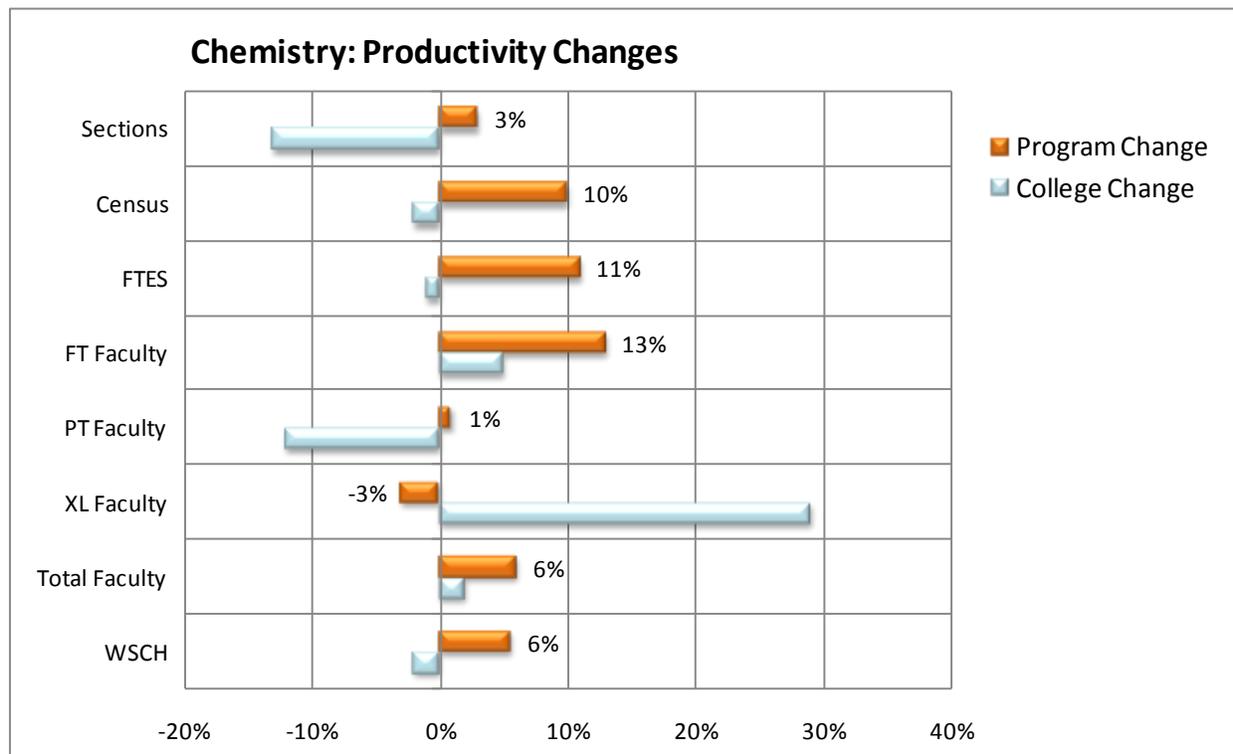
C2: Productivity Summary Table

This table is a summary of the detail information provided in the *Program Review Productivity Report*. The “3 Year Average” was computed to provide a trend benchmark to compare the results of the prior three years to the FY11 results. The “FY11 College” percentages are included to provide a benchmark to compare the program’s percentages.

Title	FY08	FY09	FY10	3 Year Average	FY11	Program Change	College Change
Sections	73	74	75	74	76	3%	-13%
Census	2,362	2,653	2,781	2,599	2,852	10%	-2%
FTES	305	340	360	335	373	11%	-1%
FT Faculty	3.73	2.96	4.27	3.65	4.12	13%	5%
PT Faculty	4.22	4.75	3.90	4.29	4.35	1%	-12%
XL Faculty	0.73	1.17	1.08	0.99	0.97	-3%	29%
Total Faculty	8.69	8.88	9.25	8.94	9.43	6%	2%
WSCH	526	574	584	562	593	6%	-2%

C3: Comparative Productivity Changes Chart

This chart illustrates the percentage change from the prior three year average productivity to the FY11 productivity. The top bar for each budget category represents the program’s change in productivity and includes the data label. The second bar represents the college’s change in productivity.



Chemistry Program Review

2011-2012

C4: Interpretation of the Program Productivity Information

The C2 Chart and the C3 Graph indicate that the program offerings have remained relatively constant over the prior three years average while the number of sections offered by the college has decreased by 13% over the same period. The WSCH/FTEF ratio has been trending upward since FY08 and is currently at 593, which is above the district goal of 525. Student enrollment continues to be strong with a 10% increase even though the number of sections has remained relatively consistent.

Chemistry Program Review

2011-2012

D1: District WSCH Ratio Productivity Table

This table shows the District WSCH ratio (WSCH/FTEF) for each course by year for this program. Courses not offered during FY11 (last year) or without faculty load (independent study) are excluded. Because these are ratios, the combined average is computed using total WSCH and total FTEF (not the average of ratios). The formula used in this table distributes FTEF to all cross-listed sections (proportional to census enrollment) but does not include the associated faculty costs of extra large assignment.

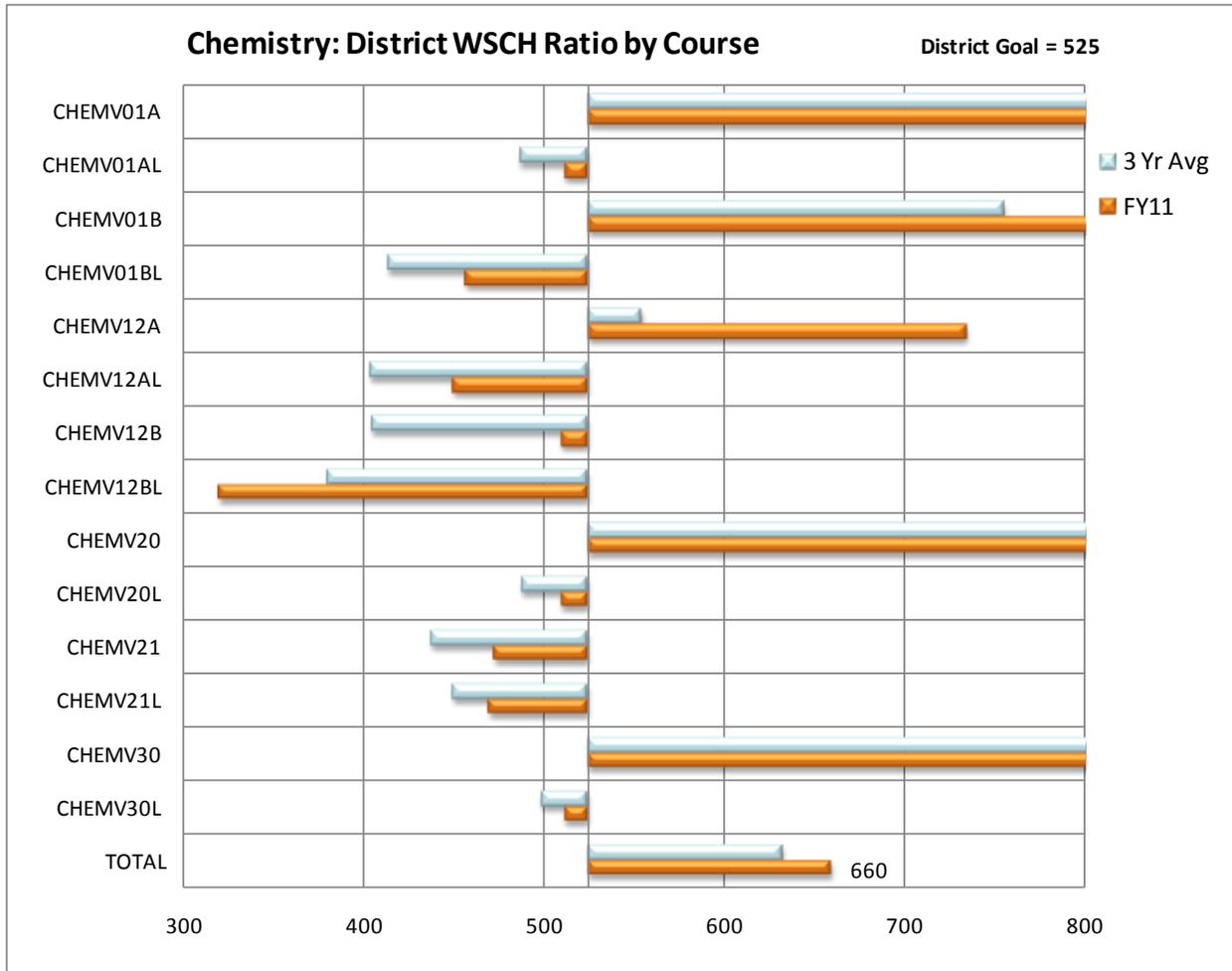
District WSCH Ratio = WSCH / (PT FTE + FT FTE).

District WSCH Ratio: Weekly Student Contact Hours/(FT FTE+PT FTE)									
Course	Title	FY08	FY09	FY10	3 Yr Avg	FY11	Change	Dist Goal	% Goal
CHEMV01A	General Chemistry I	942	1,032	1,103	1,026	1,106	8%	525	211%
CHEMV01AL	General Chemistry I Lab	462	492	507	487	512	5%	525	97%
CHEMV01B	General Chemistry II	702	705	850	756	880	16%	525	168%
CHEMV01BL	General Chemistry II Lab	337	415	490	414	457	10%	525	87%
CHEMV12A	General Organic Chemistry I	465	450	750	555	735	32%	525	140%
CHEMV12AL	Gen Organic Chemistry I Lab	270	560	460	404	450	11%	525	86%
CHEMV12B	General Organic Chemistry II	315	420	480	405	510	26%	525	97%
CHEMV12BL	Gen Organic Chemistry II Lab	440	460	310	380	320	-16%	525	61%
CHEMV20	Elementary Chemistry	953	1,115	1,112	1,060	1,107	4%	525	211%
CHEMV20L	Elementary Chemistry Lab	451	489	523	488	510	5%	525	97%
CHEMV21	Intro to Organic&Biochemistry	428	465	420	438	473	8%	525	90%
CHEMV21L	Organic & Biochemistry Lab	470	450	430	450	470	4%	525	90%
CHEMV30	Chemistry for Health Sciences	1,017	1,238	1,125	1,127	1,182	5%	525	225%
CHEMV30L	Chem for Health Sciences Lab	476	528	492	499	512	3%	525	98%
TOTAL	Annual District WSCH Ratio	576	662	661	633	660	4%	525	126%

Chemistry Program Review 2011-2012

D2: District WSCH Ratio Productivity Chart

This chart illustrates the course level District WSCH ratio. The top bar shows the program's three year average. The second bar shows the program's FY11 WSCH ratio. The axis represents the District WSCH ratio goal set in 2006. The program's (or subject's) total WSCH ratio is shown as the TOTAL at the bottom of the chart.



Chemistry Program Review

2011-2012

D3: College WSCH Ratio Productivity Table

This table shows the College's WSCH ratio (WSCH/FTEF) for each course by year for the program. Courses not offered during FY11 (last year) or without faculty load (independent study) are excluded. Because these are ratios, the combined average is computed using total WSCH and total FTEF (not the average of ratios). The formula used in this table includes the associated faculty costs of extra large sections. Faculty teaching extra large sections are paid stipends equal to 50% of their section FTE assignment for each group of 25 students beyond the first 60 students (calculated in this table as XL FTE). This College WSCH Ratio is a more valid representation of WSCH productivity. The College WSCH Ratio will be used in the program review process.

College WSCH Ratio = WSCH / (PT FTE + FT FTE + XL FTE)

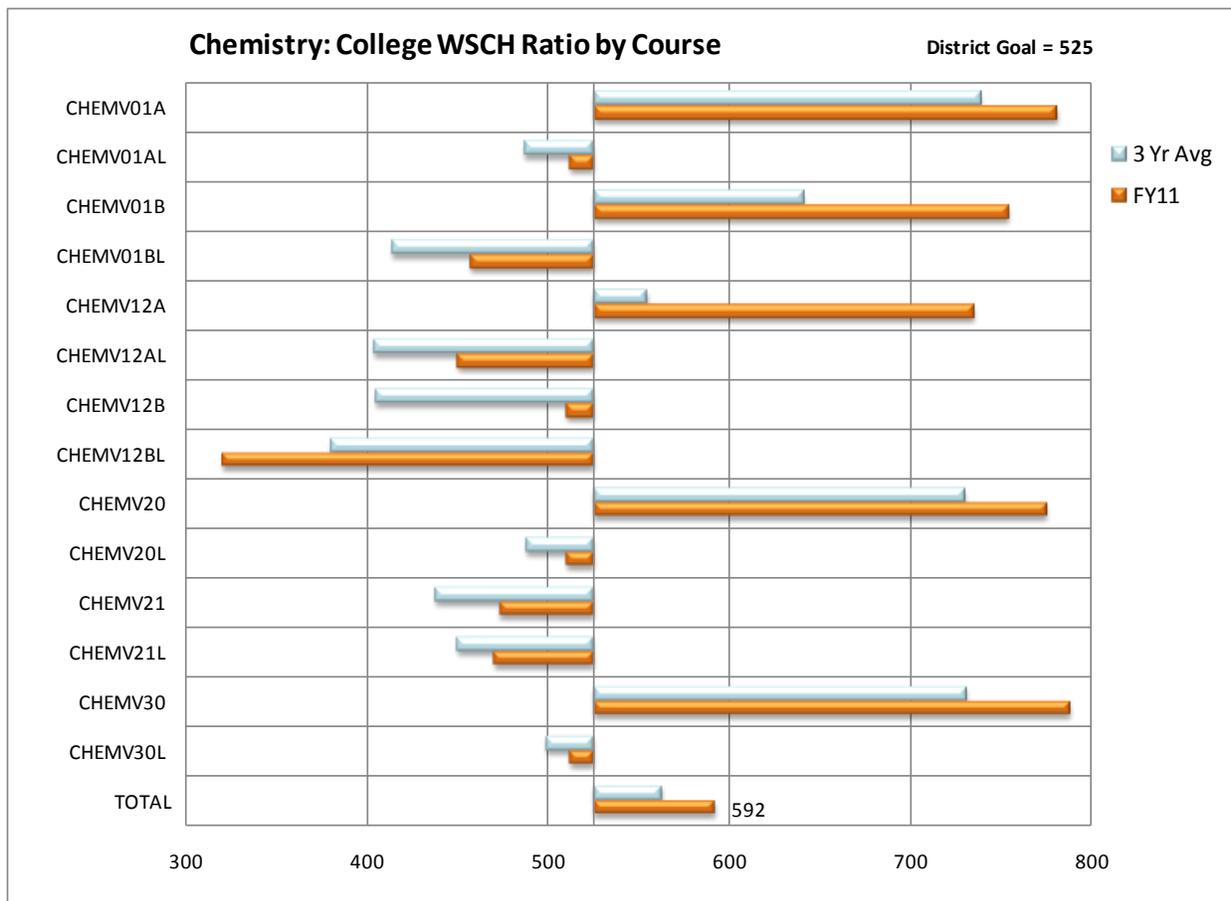
College WSCH Ratio: Weekly Student Contact Hours/(FT FTE + PT FTE + XL FTE)									
Course	Title	FY08	FY09	FY10	3 Yr Avg	FY11	Change	Dist Goal	% Goal
CHEMV01A	General Chemistry I	754	729	735	739	781	6%	525	149%
CHEMV01AL	General Chemistry I Lab	462	492	507	487	512	5%	525	97%
CHEMV01B	General Chemistry II	580	604	729	641	754	18%	525	144%
CHEMV01BL	General Chemistry II Lab	337	415	490	414	457	10%	525	87%
CHEMV12A	General Organic Chemistry I	465	450	750	555	735	32%	525	140%
CHEMV12AL	Gen Organic Chemistry I Lab	270	560	460	404	450	11%	525	86%
CHEMV12B	General Organic Chemistry II	315	420	480	405	510	26%	525	97%
CHEMV12BL	Gen Organic Chemistry II Lab	440	460	310	380	320	-16%	525	61%
CHEMV20	Elementary Chemistry	702	743	741	730	775	6%	525	148%
CHEMV20L	Elementary Chemistry Lab	451	489	523	488	510	5%	525	97%
CHEMV21	Intro to Organic&Biochemistry	428	465	420	438	473	8%	525	90%
CHEMV21L	Organic & Biochemistry Lab	470	450	430	450	470	4%	525	90%
CHEMV30	Chemistry for Health Sciences	739	707	750	731	788	8%	525	150%
CHEMV30L	Chem for Health Sciences Lab	476	528	492	499	512	3%	525	98%
TOTAL	Annual College WSCH Ratio	527	575	583	563	592	5%	525	113%

Chemistry Program Review

2011-2012

D4: College WSCH Ratio Productivity Chart

This chart illustrates the course level College WSCH ratio. The top bar shows the program's three year average. The second bar shows the FY11 WSCH ratio. The axis represents the District WSCH ratio goal set in 2006. The program's (or subject's) total WSCH ratio is shown as the TOTAL at the bottom of the chart. The computation used for the College WSCH Ratio includes XL FTE (extra-large sections) and the assignment of FTEF to all cross-listed sections (proportional to census enrollment).



D5: Productivity Detail Report

The program's detail productivity information is available in *Appendix B – Program Review Productivity Report*. This report is a PDF document and is searchable. The productivity information was extracted from the District's Banner Student System. The productivity information includes all information associated with the program's subject codes. The *Program Review Productivity Report* is sorted by subject code (alphabetical order) and includes the following sections: productivity measures and WSCH ratios by course by year.

Chemistry Program Review

2011-2012

D6: Interpretation of the Program Course Productivity Information

The D2 Chart shows mixed WSCH/FTEF ratios with the average at 593, which is above the district 525 goal. Considering the laboratory size is limited to 24 students due to safety concerns, this is a remarkable efficiency, surpassing the efficiencies from the Chemistry Departments at Oxnard and Moorpark Colleges.

CHEMV12A and CHEMV12B are high demand courses; class sizes are smaller than entry level courses being a second year level. CHEM V12B enrollment has expanded by 26% over the average of the prior three years. Inefficiencies are noted for CHEM V12BL due to attrition from Chem V12A and V12AL, yet CHEMV12BL maintains over the 15 student minimum required to offer a course.

Chemistry Program Review

2011-2012

E1: Student Success Terminology

Census	Number of students enrolled at Census (typically the 4 th week of class for fall and spring). Census enrollment is used to compute WSCH and FTES for funding purposes.
Retain	Students completing the class with any grade other than W or DR divided by Census Example: 40 students enrolled, 5 students dropped prior to census, 35 students were enrolled at census, 25 students completed the class with a grade other than W or DR: Retention Rate = 25/35 = 71%
Success	Students completing the class with grades A, B, C, CR or P divided by Census Excludes students with grades D, F, or NC.

E2: Student Success Summary

The following two tables summarize the detail information provided in the *Appendix C - Program Review Student Success Report*. The first table shows the number of students. The second table shows the percentage of students. Both tables show the distribution of student grades by year for the program (subject). They show the number of students who were counted at census, completed the class (retention), and were successful. The “3 Year Average” was computed to provide a trend benchmark to compare the prior three year expenses to the FY11 success measures. The “College” success percentages are included to compare the results of the program to the results of the college.

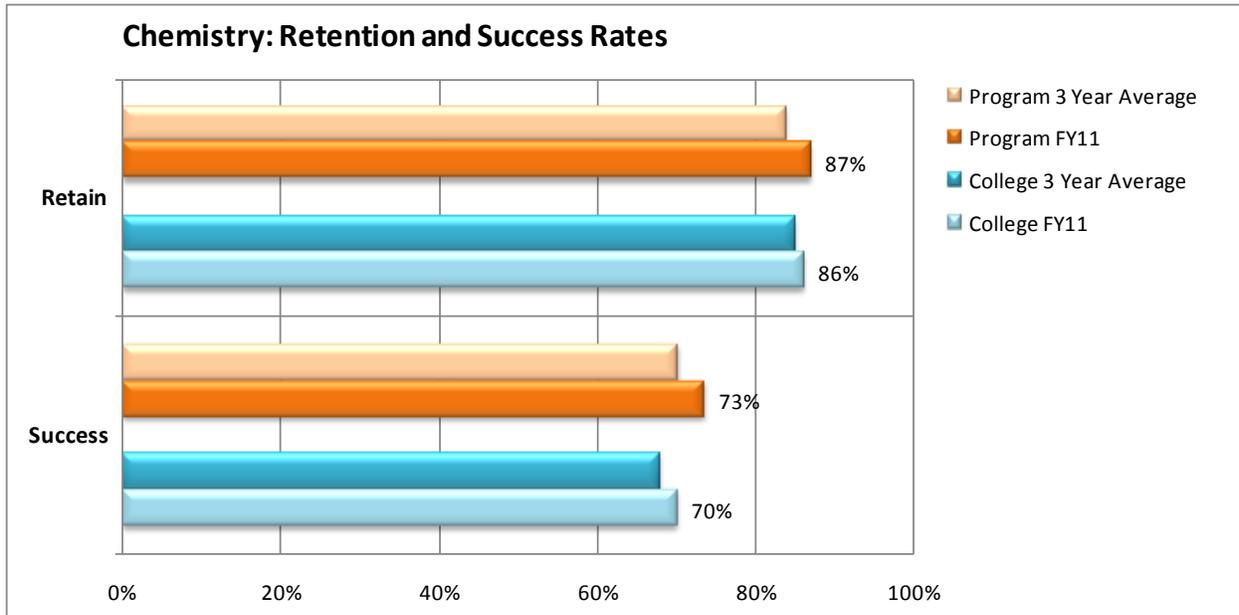
Subject	Fiscal Year	A	B	C	P/CR	D	F	W	NC	Census	Retain	Success
CHEM	FY08	703	535	355	-	149	190	369	-	2,303	1,932	1,593
CHEM	FY09	830	585	419	3	128	200	408	2	2,578	2,165	1,837
CHEM	FY10	911	604	386	3	161	204	448	-	2,717	2,269	1,904
CHEM	3 Year Avg	815	575	387	2	146	198	408	1	2,533	2,122	1,778
CHEM	FY11	973	658	425	-	156	211	367	8	2,798	2,431	2,056
Subject	Fiscal Year	A	B	C	P/CR	D	F	W	NC	Census	Retain	Success
CHEM	FY08	31%	23%	15%	0%	6%	8%	16%	0%		84%	69%
CHEM	FY09	32%	23%	16%	0%	5%	8%	16%	0%		84%	71%
CHEM	FY10	34%	22%	14%	0%	6%	8%	16%	0%		84%	70%
CHEM	3 Year Avg	32%	23%	15%	0%	6%	8%	16%	0%		84%	70%
CHEM	FY11	35%	24%	15%	0%	6%	8%	13%	0%		87%	73%
College	3 Year Avg	33%	19%	12%	5%	5%	10%	15%	2%		85%	68%
College	FY11	33%	20%	13%	3%	5%	10%	14%	2%		86%	70%

Chemistry Program Review

2011-2012

E3: Retention and Success Rates

This chart illustrates the retention and success rates of students who were counted at census. Each measure has four bars. The first bar represents the program's prior three year average percent. The second bar shows last year's (FY11) percent. The third and fourth bars represent the overall college percents.

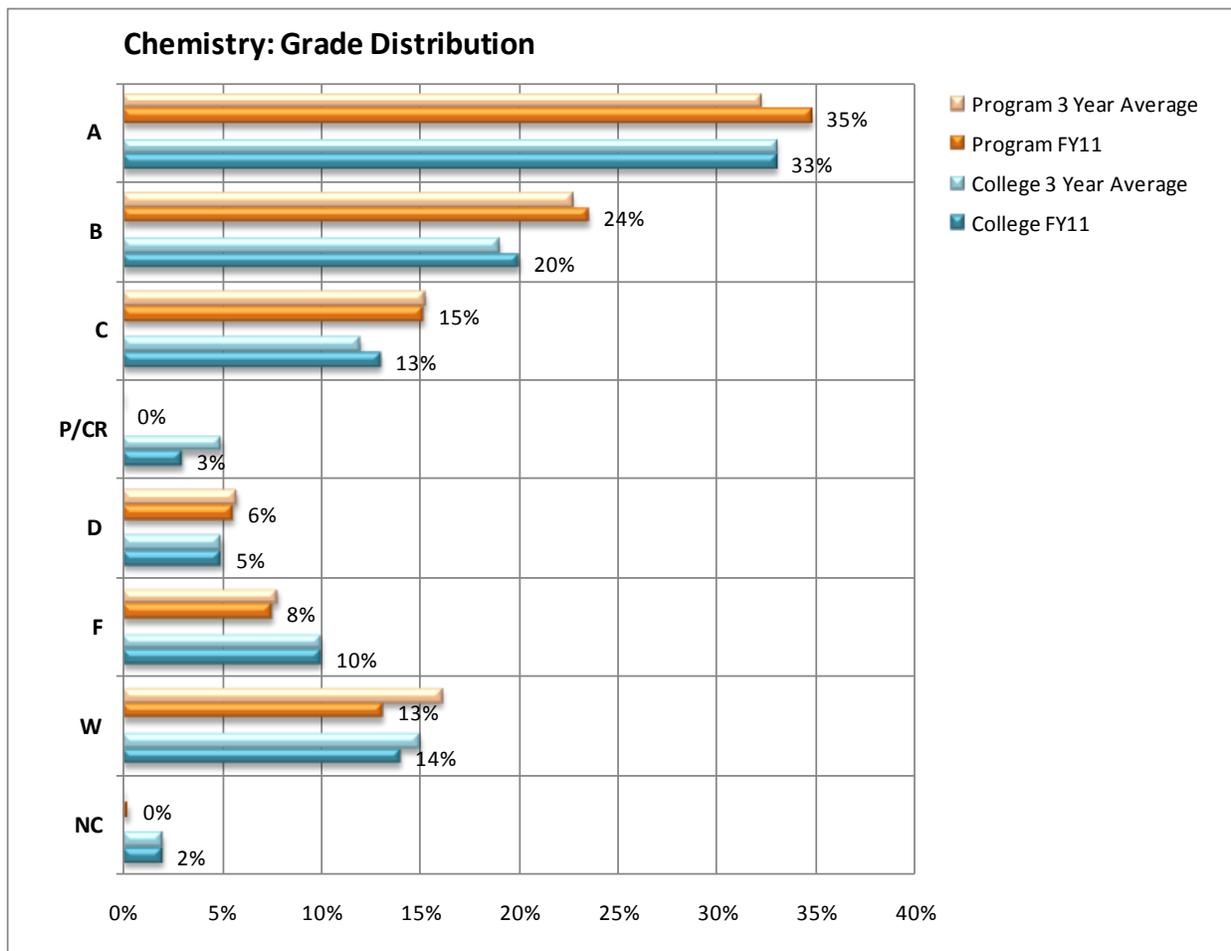


Chemistry Program Review

2011-2012

E4: Grade Distribution

This chart illustrates the program's distribution of grades (by subject). Each grade has four bars. The first bar represents the program's prior three year average percent of grades. The second bar shows last year's (FY11) grade distribution percents. The third and fourth bars represent the overall college distribution percents.



E5: Student Success Detail Report

The program student success detail information is available in *Appendix C – Program Review Student Success Report*. This report is a PDF document and is searchable. The student success information was extracted from the District's Banner Student System. The student success information includes all information associated with the program's subject codes. The *Program Review Student Success Report* is sorted by subject code (alphabetical order) and includes the following sections: comparative summary and course detail by term. The following table defines the terminology.

Chemistry Program Review

2011-2012

E6: Interpretation of Program Retention, Student Success, and Grade Distribution

Student success and retention rates in Chemistry are slightly higher than the prior three year average of the program and the college, which is remarkable considering the academic rigor of the department's course offerings. The increase in retention and success rates may be partially attributed to the enforcement of prerequisites.

Grade distributions mirror those of the college with 35% of the students receiving A's and 24% of successful students receiving B's. Preliminary analysis shows that there is not consistency between laboratory grading policies among instructors. The department intends to address this by establishing a more standardized assessment of student achievement.

Lab grades are generally higher than lecture grades due to the cooperative learning environment which may also be responsible for skewing the grade distribution.

Chemistry Program Review

2011-2012

F1: Program Completion – Student Awards

This table shows the number of students who completed a program certificate or degree during the fiscal year. Gender distribution is included. The following chart illustrates this information.

No certificates or degrees.

F2: Interpretation of the Program Completion Information

Chemistry Program Review 2011-2012

G1: Student Demographics Summary Tables

This table shows the program and college census enrollments for each demographic category. It also shows the average age of the students. The program FY11 results can be compared to its prior three-year average, the college FY11 results, and the college prior three-year average.

Subject	FY	Hispanic	White	Asian	Afr Am	Pac Isl	Filipino	Nat Am	Other	Female	Male	Other	Avg Age
CHEM	FY08	873	800	132	71	21	157	19	230	1,358	931	14	26
CHEM	FY09	968	922	145	71	19	200	25	228	1,531	1,034	13	25
CHEM	FY10	1,089	1,027	162	51	14	168	18	188	1,519	1,195	3	24
CHEM	3 Year Avg	977	916	146	64	18	175	21	215	1,469	1,053	10	25
CHEM	FY11	1,110	1,085	166	50	18	197	20	152	1,614	1,183	1	24
College	3 Year Avg	11,806	11,169	988	1,005	217	827	403	2,302	15,888	12,694	134	27
College	FY11	13,034	10,566	977	1,040	196	886	402	1,688	15,734	13,014	40	24

This table shows the program and college percentage of census enrollments for each demographic category.

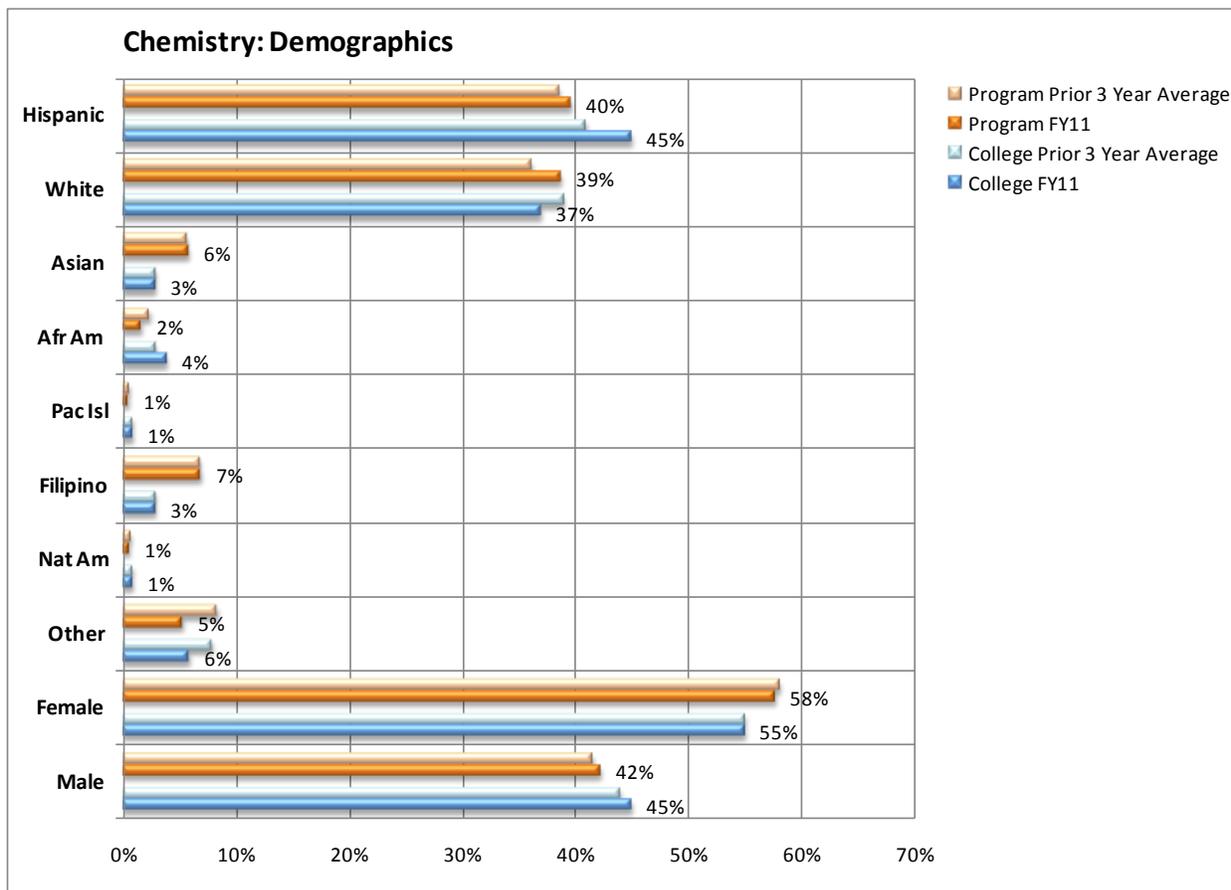
Subject	FY	Hispanic	White	Asian	Afr Am	Pac Isl	Filipino	Nat Am	Other	Female	Male	Other	Avg Age
CHEM	FY08	38%	35%	6%	3%	1%	7%	1%	10%	59%	40%	1%	26
CHEM	FY09	38%	36%	6%	3%	1%	8%	1%	9%	59%	40%	1%	25
CHEM	FY10	40%	38%	6%	2%	1%	6%	1%	7%	56%	44%	0%	24
CHEM	3 Year Avg	39%	36%	6%	3%	1%	7%	1%	8%	58%	42%	0%	25
CHEM	FY11	40%	39%	6%	2%	1%	7%	1%	5%	58%	42%	0%	24
College	3 Year Avg	41%	39%	3%	3%	1%	3%	1%	8%	55%	44%	0%	27
College	FY11	45%	37%	3%	4%	1%	3%	1%	6%	55%	45%	0%	24

Chemistry Program Review

2011-2012

G2: Student Demographics Chart

This chart illustrates the program's percentages of students by ethnic group. . Each group has four bars. The first bar represents the program's prior three year percent. The second bar shows last year's (FY11) percent. The third and fourth bars represent the overall college percents.



G3: Student Demographics Detail Report

The program student success detail information is available in *Appendix D – Program Review Student Demographics Report*. This report is a PDF document and is searchable. The student success information was extracted from the District's Banner Student System. The student demographic information includes all information associated with the program's subject codes. The *Program Review Student Demographics Report* is sorted by subject code (alphabetical order) and includes the following sections: comparative summary by year, and detail demographics by term and course.

G4: Interpretation of the Program Demographic Information

The ethnic and gender distribution in Chemistry has remained relative constant over the past three years and roughly mirrors the college as a whole. Given the historical underrepresentation of women in chemistry, we continue to experience growth in our female demographic. In fact, the department has a

Chemistry Program Review

2011-2012

higher percentage of women than the college as a whole. There also has been a large increase in the number of Hispanic students served, although the percent of enrollment has remained slightly below the college average.

Chemistry Program Review

2011-2012

4. Performance Assessment

A1: Program-Level Student Learning Outcomes

Program-Level Student Learning Outcome 1	Performance Indicators
Apply the Scientific Method to analyze and interpret data in order to draw valid conclusions.	Students will formulate and test hypotheses using guided experimentation using modern analytical equipment, collect and analyze data, and demonstrate mastery by comparison of their conclusions to acceptable metrics. 80% of the students enrolled in Chem 1B and higher-level courses will achieve mastery.
Operating Information	
In CHEM 1B, 83% of the students were able to apply the scientific method to evaluate a chemical reaction system to determine how chemical equilibria will be altered by changes in temperature, concentration or pressure by applying LeChatelier's principle. Other courses in the program are to be evaluated in the future after development of appropriate rubrics for measuring this program-level SLO.	
Analysis – Assessment	
In the one course evaluated, students met the performance goal. More data is needed in CHEM 1B and organic chemistry lab courses. Equipment in the organic chemistry labs needs to be updated to allow proper collection and analysis of data.	

Program-Level Student Learning Outcome 2	Performance Indicators
Communicate scientific ideas effectively in a logical and understandable manner, both verbally and in writing.	Laboratory reports are collected weekly and evaluated using rubrics to assess student's ability to communicate scientific concepts. In addition, students are asked to verbally communicate scientific ideas both formally and informally during lab. In lecture, homework and tests are used to measure students' ability to effectively communicate scientific ideas. 80% of the students will achieve mastery.
Operating Information	
Insufficient data is available to assess this PLSLO.	
Analysis – Assessment	
Data relating to this SLO has been collected, but further analysis of this data will be required. Additional data	

Chemistry Program Review

2011-2012

will need to be gathered and interpreted due to variations in instructor data collection methodologies.

Chemistry Program Review

2011-2012

Program-Level Student Learning Outcome 3	Performance Indicators
Demonstrates proficiency in current chemical laboratory safety and skills.	A safety lecture and corresponding contract is given at the beginning of the semester to ensure that students have the required knowledge. Students are continually monitored during lab to ensure safe laboratory practices are followed. Students are asked questions in the lab pretest to demonstrate safe laboratory practices and basic laboratory skills including; massing (weighing) objects, dispensing measured amounts of solids and liquids, following written laboratory instructions, using fume hoods, making observations, and recording data.
Operating Information	
Students are given a safety handout sheet and lecture demonstrating safe laboratory practices. All students will demonstrate safe laboratory practices and skills throughout all laboratory courses in the program as a condition of continuing in the program.	
Analysis – Assessment	
Safety violations or improper laboratory practices have caused very few accidents. In FY11 there were no serious accidents in the chemistry program with over 1200 students enrolled.	

Chemistry Program Review

2011-2012

4B: Student Success Outcomes

Student Success Outcome 1	Performance Indicators
The program will maintain its retention rate at the average of the program's prior three-year retention rate. The retention rate is the number of students who finish a term with any grade other than W or DR divided by the number of students at census.	The program will maintain the retention rate at the average of the program's retention rate for the prior three years.
Operating Information	
Chemistry's prior three year average retention rate was 84%. Chemistry's FY11 retention rate was 87%. (3E2 and 3E3)	
Analysis – Assessment	
In FY 11 Chemistry student retention rate was 3% greater than the program average for the prior three years and this Student Success Outcome was met. The Chemistry department is on track with serving the needs of the students and improving student retention.	

Student Success Outcome 2	Performance Indicators
The program will continue to exceed the college's three-year average retention rate. The retention rate is the number of students who finish a term with any grade other than W or DR divided by the number of students at census.	The program will exceed the average of the college retention rate for the prior three years.
Operating Information	
The college prior three year average retention rate was 85%. Chemistry's FY11 retention rate was 87%. (3E2 and 3E3)	
Analysis – Assessment	
Chemistry student retention rate in FY 11 was 1% greater than the college average for the prior three years. The Chemistry department is on track with serving the needs of the students and improving student retention. It is likely that student retention was improved by the student support services provided by the STEM grant. A variety of student support services are available including: tutoring, financial aid, and instructor office hours. A STEM grant also provided support for qualifying students in STEM disciplines. Extraordinary services were provided to STEM program students including a textbook lending program, counseling, collaboration and research opportunities. Courses will continue to be offered at times that are convenient for students. A scheduling matrix is used to prevent conflicts with single section major's classes in the Math-Science division.	

Chemistry Program Review

2011-2012

Student Success Outcome 3	Performance Indicators
The program will maintain the student success rates at the average of the program's prior three-year success rates. The student success rate is the percentage of students who receive a grade of C or better.	The program will maintain student success rate at the program's average student success rate for the prior three years.
Operating Information	
Chemistry's prior three year average student success rate was 70%. Chemistry's FY11 retention rate was 73%. (3E2 and 3E3)	
Analysis – Assessment	
In FY 11 the Chemistry student success rate was 3% greater than the program average for the prior three years. (See Table E2 and Graph E3) The Chemistry department is on track with serving the needs of the students and improving student success. It is likely that student success was improved by the student support services provided by the STEM grant. Tutoring is offered through the Tutoring Center for all levels of chemistry. Instructors meet with students during office hours to address student concerns.	

Student Success Outcome 4	Performance Indicators
The program will exceed the college's three-year average student success rates. The student success rate is the percentage of students who receive a grade of C or better.	The program student success will exceed the average of the college's student success rate for the prior three years.
Operating Information	
The college prior three year average student success rate was 68%. Chemistry's FY11 retention rate was 73%. (3E2 and 3E3)	
Analysis – Assessment	
In FY 11, the Chemistry student success rate was 5% greater than the college average for the prior three years. This success is coupled with increasing enrollments reflects the dedication and hard work of the chemistry faculty. Tutoring is offered through the Tutoring Center for all levels of chemistry. Instructors meet with students during office hours to address student's academic needs for their course.	

Chemistry Program Review

2011-2012

5. Findings

Finding 1:

Both gas chromatographs in organic chemistry laboratory are in need of service contracts and updated software. Infrared spectrophotometers, the liquid chromatographic mass spectrometer, and the atomic absorption spectrophotometer should have service contracts to avoid gaps in service. (See analysis in Program-level SLO 1 and Program Operating Outcome 4.)

Finding 2:

Elementary Chemistry laboratory is in need of modern data gathering and analysis techniques to better prepare students for higher-level courses and transfer. Computers and data sensors would fill the gap in this area. (See analysis in Student Success Outcome 5.)

Finding 3:

The chemistry program is exceeding 525 efficiency goal set by the district. (See Section 3 - Operating Information: D3 Table, D4 Chart, D6 Analysis, and Student Success Outcomes 1 and 2.)

Finding 4:

The curriculum is current and is meeting the needs of the students. Retention and success rates are above the college's as a whole. See Table 3E2, Chart 3E3, and Data Interpretation E6. Grade distributions show some lack of consistency regarding expectations for student achievement especially in lower level chemistry courses.

Chemistry Program Review

2011-2012

6. Initiatives

Initiative : Improve Instrumentation in Organic Chemistry Laboratory

Initiative ID: CHEM1-12

Links to Finding 1: In order for students to successfully synthesize and analyze compounds, it is critical that students have access to a variety of instrumentation. Currently one of our most frequently used pieces of equipment- a gas chromatograph- is often inoperable due to maintenance issues such as going out of calibration, software bugs and mechanical failures. This is significantly reducing the amount of exposure that students have to this technique and subsequently has resulted in poorer performance when this topic is covered in both the lecture and lab class SLOs'. The department has developed a plan to improve student performance on these SLOs by updating the software and increasing the frequency of maintenance of the machine.

Benefits: Improvement in student access to gas chromatography will increase students' ability to grasp the theory and application of organic compound characterization

Request for Resources: Organic Lab- GC (gas chromatography) service contract (\$2200/year) and software update to Clarity Lite (\$6000)

Funding Sources:

Please check one or more of the following funding sources.

No new resources are required (use existing resources)	
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	X
Requires computer equipment funds (hardware and software)	X
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	

Chemistry Program Review

2011-2012

Initiative : Improve student access to technology in the Elementary Chemistry Laboratory

Initiative ID: CHEM2-12

Links to Finding 2: In order to improve students' ability to measure chemical quantities accurately, the department has developed several strategies to aid student performance on Student Success Outcome 5. Techniques often are first demonstrated by the instructor, but often this is hard for many students to see due to the configuration of the lab room. Access to additional presentation equipment including a data projector, computer and visualizer would aid this. In addition, students would benefit from access to computer data collection sensors and the ability to analyze data using software such as Excel. Finally, the last part of the department's strategy to improve student lab technique is to allow students more opportunities to repeat unknowns. This will require more staff labor to prepare the unknowns, however, and additional staffing especially in the evening to prepare the lab rooms.

Benefits: Using modern data collection and analysis will improve students' ability to accurately see relationships between physical properties and relate observations to underlying chemical principles. Students will be able repeat lab assignments more frequently, self-correct mistakes, and improve their understanding of the practice of chemistry and its underlying principles.

Request for Resources:

Elementary Chemistry Lab- 8 computers for student use (\$7000)
Elementary Chemistry Lab- data projector (\$1600),
Visualizer (\$1500), and instructor computer (\$900)
Increase hours for student worker to prepare samples student samples

Funding Sources:

Please check one or more of the following funding sources.

No new resources are required (use existing resources)	
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	X
Requires computer equipment funds (hardware and software)	X
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	

Chemistry Program Review

2011-2012

Initiative : Increase student support resources.

Initiative ID: CHEM3-12

Links to Finding 3: Overall, in courses where the SLO was not met, the department believes that increasing access to support outside of the classroom would be very beneficial to students, especially given our large (70+ students) classes. Increased college support for the tutoring center, additional SI tutors, and the development of additional online resources for students will be pursued by the department to increase student engagement and success.

Benefits: Students would be able to achieve all SLO given the appropriate support.

Request for Resources:

Supplemental Instructor (SI) for chemistry courses \$3000/semester,

Increased availability of chemistry tutors \$2000/semester

Two video cameras \$1500 for development of online resources

Training and support needed to help instructors develop on-line tools for students.

Funding Sources:

Please check one or more of the following funding sources.

No new resources are required (use existing resources)	
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	X
Requires computer equipment funds (hardware and software))	
Requires college equipment funds (other than computer related)	X
Requires college facilities funds	
Requires other resources (grants, etc.)	

Chemistry Program Review

2011-2012

Initiative : Increase standardization of student assessment in multi-section classes.

Initiative ID: CHEM4-12

Links to Finding 4: Overall, the chemistry department has a grade distribution that mirrors the college as a whole. Closer analysis has shown that the grade distribution between lecture and lab courses and especially between lab sessions is inconsistent. Lecture classes average at approximately 15-25% A's while lab classes vary from between 10 % A's to more than 50% A's for example. While lab grades tend to be higher due to cooperative nature of lab classes, the large variation in grade distributions is heavily influenced by a lack of consistent grading rubrics and other metrics among instructors. The department needs to develop consistent assessment tools especially in laboratory classes.

Benefits: Students would have a similar classroom experience and have similar preparation for more advanced classes.

Request for Resources:

None- Will be address in department meetings and flex time activities

Funding Sources:

Please check one or more of the following funding sources.

No new resources are required (use existing resources)	
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	X
Requires computer equipment funds (hardware and software))	
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	

6A: Initiatives Priority Spreadsheet

The following blank tables represent Excel spreadsheets and will be substituted with a copy of the completed Excel spreadsheets. **The program's initiatives will be entered into the Excel spreadsheets by resource category and consolidated into division and college-wide spreadsheets.**

Personnel –Faculty Requests

Chemistry Program Review

2011-2012

Other	Program	Program Priority (0, 1, 2, 3...)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (R, H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost	No New Resources Requested	General Fund	Other
1												
2												
3												
4												
5												

Personnel – Other Requests

Personnel - Other	Program	Program Priority (0, 1, 2, 3...)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (R, H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost	No New Resources Requested	New General Funds	Other
1												
2												
3												
4												
5												

Chemistry Program Review

2011-2012

Computer Equipment and Software

Equipment - Computer Related	Program	Program Priority (0, 1, 2, 3...)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (R, H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost	No New Resources Requested	Technology Fund	Other
1												
2												
3												
4												
5												

Other Equipment Requests

Equipment	Program	Program Priority (0, 1, 2, 3...)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (R, H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost	No New Resources Requested	Equipment Fund	Other
1												
2												
3												
4												
5												

Facilities Requests

Facilities	Program	Program Priority (0, 1, 2, 3...)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (R, H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost	No New Resources Requested	Facilities Fund	Other
1												
2												
3												
4												
5												

Chemistry Program Review

2011-2012

Other Resource Requests

Other Resources	Program	Program Priority (0, 1, 2, 3...)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (R, H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost	No New Resources Requested	General Fund	Other
1												
2												
3												
4												
5												

6B: Program Level Initiative Prioritization

All initiatives will first be prioritized by the program staff. If the initiative can be completed by the program staff and requires no new resources, then the initiative should be given a priority 0 (multiple priority 0 initiatives are allowed). All other initiatives should be given a priority number starting with 1 (only one 1, one 2, etc.).

6C: Division Level Initiative Prioritization

The program initiatives within a division will be consolidated into division spreadsheets. The dean may include additional division-wide initiatives. All initiatives (excluding the '0' program priorities) will then be prioritized using the following priority levels:

R: Required – mandated or unavoidable needs (litigation, contracts, unsafe to operate conditions, etc.).

H: High – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

M: Medium – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

L: Low – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

6D: Committee Level Initiative Prioritization

The division's spreadsheets will be prioritized by the appropriate college-wide committees (staffing, technology, equipment, facilities) using the following priority levels.

R: Required – mandated or unavoidable needs (litigation, contracts, unsafe to operate conditions, etc.).

H: High – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

M: Medium – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

L: Low – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

Chemistry Program Review

2011-2012

6E: College Level Initiative Prioritization

Dean's will present the consolidated prioritized initiatives to the College Planning Council. The College Planning Council will then prioritize the initiatives using the following priority levels.

R: Required – mandated or unavoidable needs (litigation, contracts, unsafe to operate conditions, etc.).

H: High – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

M: Medium – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

L: Low – approximately 1/3 of the total division's initiatives by resource category (personnel, equipment, etc.)

Chemistry Program Review

2011-2012

7A: Appeals

After the program review process is complete, your program has the right to appeal the ranking of initiatives.

If you choose to appeal, please complete the form that explains and supports your position. The appeal will be handled at the next higher level of the program review process.

7B: Process Assessment

In this first year of program review using the new format, programs will be establishing performance indicators (goals) for analysis next year. Program review will take place annually, but until programs have been through an entire annual cycle, they cannot completely assess the process. However, your input is very important to us as we strive to improve, and your initial comments on this new process are encouraged.