Chemistry Program Review
2012-2013

1. Program/Department Description

1A. Description

Students participating in the Chemistry Program will be able to apply the scientific method to analyze and interpret data in order to draw valid conclusions, relate observable macroscopic properties to underlying microscopic principles, communicate scientific ideas effectively in a logical and understandable manner, both verbally and in writing, and become proficient in current chemical laboratory safety and skills. Students may participate in both lecture and laboratory courses designed to prepare them for majors such as nursing, environmental studies, biology and many others at Ventura College or a four-year institution. In addition, students will find careers in such fields as medicine and pharmaceuticals, petroleum, nanotechnology, business, and education.

Degrees/Certificates

N/A

1B. 2012-2013 Estimated Costs (Certificate of Achievement ONLY)

Required for Gainful Employment regulations.

N/A

	Cost		Cost		Cost		Cost
Enrollment Fees		Enrollment Fees					
Books/ Supplies		Books/ Supplies					
Total		Total		Total		Total	

1C. Criteria Used for Admission

Students must meet prerequisites for individual courses.

1D. College Vision

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

1E. College 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 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.

1F. College 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

1G. Program/Department Significant Events (Strengths and Successes)

The program has been closely working with CSU- Channel Islands on their STEM grant designed to increase the number of science and engineering transfer students. In addition, the department has made significant progress in measuring Student Learning Outcomes (SLOs) and modifying curriculum based on the results of SLO assessments. The department has also incorporated technology in the classroom including upgrading the Elementary Chemistry Lab with computers and a data projector from last year's Program Review funds, and incorporating online homework in our General Chemistry lecture classes. The chemistry program has surpassed the district 525 goal in FY12 by efficient scheduling and has success and retention rates above the college averages. The department also regularly participates in outreach programs including the upcoming Science Night at CSUCI. Faculty have also been active in the nanotechnology program at UCSB.

K. Organizational Structure

President: Robin Calote
Executive Vice President: Ramiro Sanchez
Dean: Dan Kumpf
Department Chair: Joe Selzler

Instructors and Staff

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.

2. Performance Expectations

2A. Student Learning Outcomes

2A1. 2012-2013 - *Institutional* Student Learning Outcomes

1. Communication - written, oral and visual
2. Reasoning - scientific and quantitative
3. Critical thinking and problem solving
4. Information literacy
5. Personal/community awareness and academic/career responsibilities

2A2. 2012-2013- *Program* Level Student Learning Outcomes

For programs/departments offering degrees and/or certificates

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.

2A3. 2012-2013 - *Course* Level Student Learning Outcomes

Attached to program review (See appendices).

2B. 2012-2013 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.

2C. 2012-2013 Program OPERATING Outcomes

1. The department will maintain WSCH/FTEF above the 525 goal set by the district.
2. The department will have an inventory of instructional equipment that 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 valued 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 will 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.

2D. Mapping of Student Learning Outcomes - *Refer to TracDat*

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
2012-2013

3. Operating Information

3A. 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 4th 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 prior practice of not including these assignments as part of FTEF. However, it is necessary to account for these assignments to properly 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 x 40 x 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 x 15
District Goal	Program WSCH ratio goal. WSCH/FTEF The District goal was set in 2006 to recognize the differences in program productivity.

3B: Student Success Terminology

Census	Number of students enrolled at Census (typically the 4th 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.

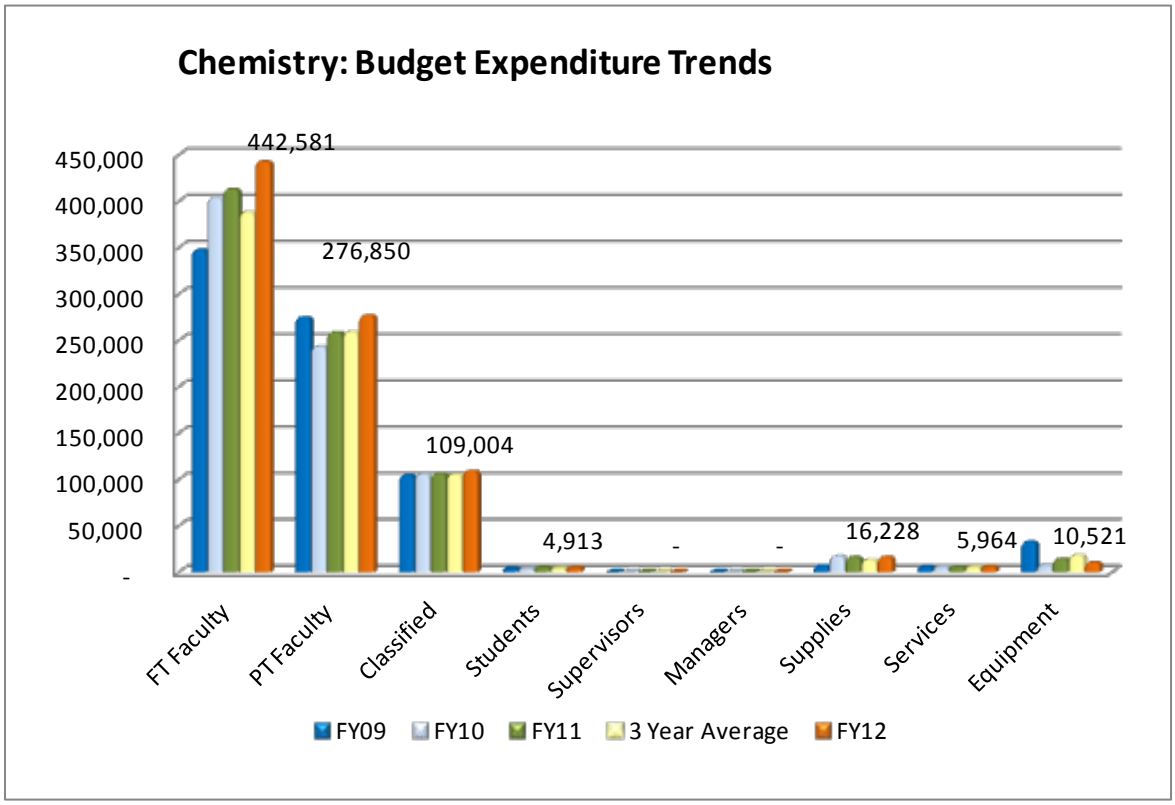
Program specific data was provided in Section 3 for all programs last year. This year, please refer to the data sources available at *(link will be provided to college website).*

In addition, the 2011-2012 program review documents will provide examples of last year's data and interpretations.

3C: 2012 - 2013 Please provide program interpretation for the following:

3C1: Interpretation of the Program Budget Information

Category	Title	FY09	FY10	FY11	3 Year Average	FY12	Program Change from Prior Three Year Average	College Change from Prior Three Year Average
1	FT Faculty	347,413	403,564	412,879	387,952	442,581	14%	8%
2	PT Faculty	274,635	243,071	258,597	258,768	276,850	7%	-8%
3	Classified	104,474	105,505	105,984	105,321	109,004	3%	-7%
4	Students	3,997	4,350	5,217	4,521	4,913	9%	2%
5	Supervisors	-	-	-	-	-	0%	6%
6	Managers	-	-	-	-	-	0%	0%
7	Supplies	6,758	17,128	16,052	13,313	16,228	22%	1%
8	Services	5,886	5,917	5,560	5,788	5,964	3%	2%
9	Equipment	32,753	7,320	14,154	18,076	10,521	-42%	18%
	Total	**775,916**	**786,855**	**818,443**	**793,738**	**866,061**		**0%**



The program shows a 14% increase in average FT faculty expenditures over the last three years which exceeds the College's growth as a whole. The department hired a full time faculty member in FY2009 which accounts for most of this increase. Other factors include step and column increases for junior faculty, and increased full-time instructor loads. PT faculty expenditures are also up due to similar factors. Our one classified employee (lab technician) has been reduced from a twelve month to an eleven month schedule but this change is not reflected in the above data.

The supplies budget shows a 22% increase over the average of the past three years; however, FY09 reported in table 3.C1 does not reflect an additional $10,000 from the physical science account. Taking this into account, the chemistry supply budget has decreased by about 5% from its peak in FY10 in spite of increases in students served and inflationary pressures. (See initiative)

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. Program Review did provide some funding for computers and AV equipment in FY 11 and FY 12 which resulted in an increase level of support although the funding did not address the department's needs for analytical equipment such as balances, data sensors, etc. The department often struggles to find funds to fix equipment when it breaks down.

Due to limited availability of unknown samples and staff preparation time, students are unable to repeat experiments which they have not mastered. The department addresses this deficiency in one of our initiatives.

In FY12 the department generated 383 FTES which equates to approximately $1.75 million in state apportionment. The department's expenses were therefore approximately 50% of the revenue it generated.

3C2: Interpretation of the Program Inventory Information

Inventory: Chemistry, General	190500	Org	Fund	Date	Age	Cost	Perm Tag#	Serial #
Shipping	Fisher Scientific	30183	12845	9/3/2009	3	1,525		
Model 9530-1 Cat# 08-261-2A Melting	Fisher Scientific	30183	12845	9/16/2009	3	1,525		
Model 9530-1 Cat# 08-261-2A Melting	Fisher Scientific	30183	12845	9/16/2009	3	147		
Model 1101D Cat# 12-144-65 Melting	Fisher Scientific	30183	12845	9/3/2009	3	1,525	N00018878	
Model 1101D Cat# 12-144-65 Melting	Fisher Scientific	30183	12845	9/3/2009	3	147	N00018878	
Model 1101D Cat# 12-144-65 Melting	Fisher Scientific	30183	12845	9/3/2009	3	1,584	N00018877	
Model 1101D Cat# 12-144-65 Melting	Fisher Scientific	30183	12845	9/3/2009	3	1,525	N00018876	
Model 1101D Cat# 12-144-65 Melting	Fisher Scientific	30183	12845	9/3/2009	3	30	N00018876	
Shipping	Fisher Scientific	30183	12845	9/3/2009	3	30		
04354 Ignition Unit 115VAC 50/60 HZ	Fisher Scientific	30183	12807	4/14/2008	4	3,811		
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018678	C5YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018686	J6YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018685	G6YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018684	96YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018683	76YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018682	66YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018681	36YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018680	16YJQH1
Cat#RCRC982538-1881193 Latitude	Dell Computer C	30183	12819	12/8/2008	4	1,227	N00018679	J5YJQH1
043502 Calorimeter 115VAC 50/60 H	Fisher Scientific	30183	12807	4/14/2008	4	3,811	N00018474	1341-0802-6803
043502 Calorimeter 115VAC 50/60 H	Fisher Scientific	30183	12807	4/14/2008	4	3,811	N00018475	1341-0802-6802
28750-10 Spectrophotometer-AA 115	Cole-Parmer	30183	12807	4/23/2008	4	11,342	N00018483	1242
QP600-1-SR 600um Diameter Optical	Ocean Optics	30183	12845	11/25/2008	4	3,881		N/A
CHEMUSB4-UV-VIS UV-Vis Spectrop	Ocean Optics	30183	12845	11/25/2008	4	222	N00018672	
CHEMUSB4-UV-VIS UV-Vis Spectrop	Ocean Optics	30183	12845	11/25/2008	4	3,881	N00018672	
QP600-1-SR 600um Diameter Optical	Ocean Optics	30183	12845	11/25/2008	4	222		N/A
170-2525EDU Smart Spec Plus Spect	Bio-Rad Laborat	30183	12845	11/13/2008	4	4,258	N00018658	273BR05069
QP600-1-SR 600um Diameter Optical	Ocean Optics	30183	12845	11/25/2008	4	222		N/A
QP600-1-SR 600um Diameter Optical	Ocean Optics	30183	12845	11/25/2008	4	3,881		N/A
QP600-1-SR 600um Diameter Optical	Ocean Optics	30183	12845	11/25/2008	4	222		N/A
Shipping	Gow Mac Instru	30183	12845	10/21/2008	4	5,250		
Gow-MAC Series 400 Basic Isotherm	Gow Mac Instru	30183	12845	10/21/2008	4	5,250	N00018669	V302810

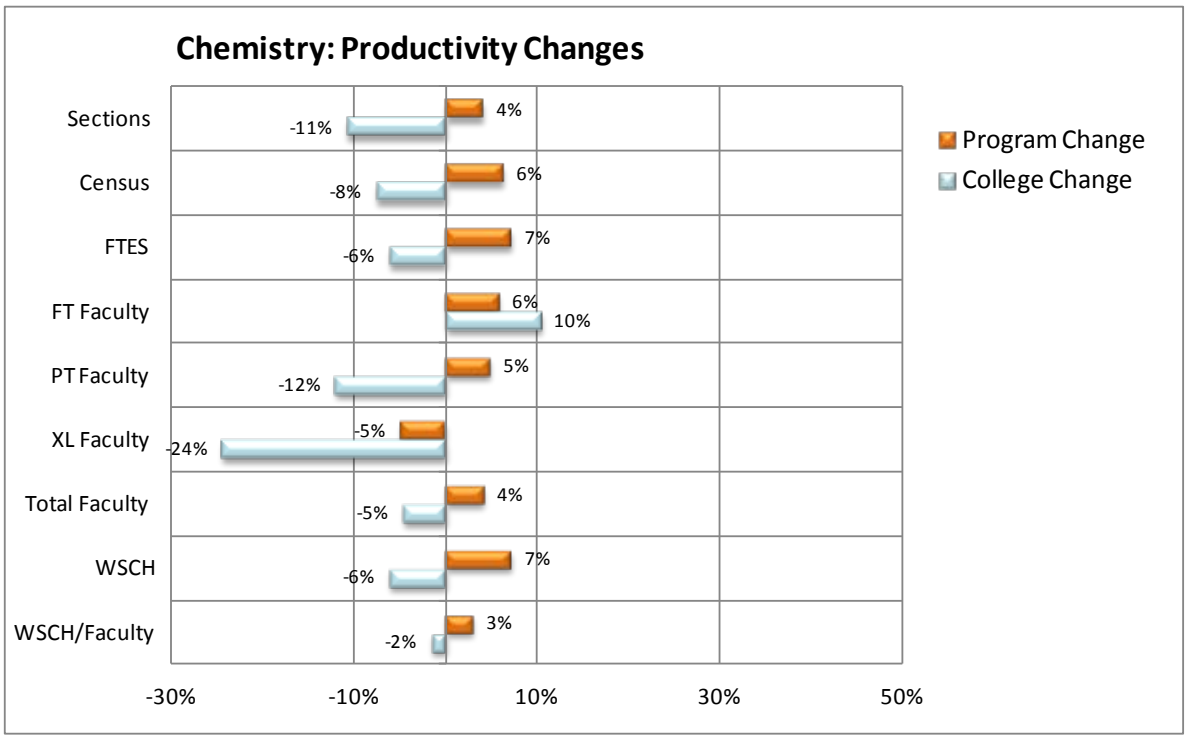
Additional Shipping	Gow Mac Instru	30183	12845	10/21/2008	4	60
Gow-MAC Series 580 Isothermal Gas	Gow Mac Instru	30183	12845	10/21/2008	4	60
Shipping	Bio-Rad Laborat	30183	12845	11/13/2008	4	24
Shipping	Bio-Rad Laborat	30183	12845	11/13/2008	4	4,258
170-2525EDU Smart Spec Plus Spect	Bio-Rad Laborat	30183	12845	11/13/2008	4	24
QP600-1-SR 600um Diameter Optical	Ocean Optics	30183	12845	11/25/2008	4	3,881
Item #1034 Ice machine 200# underc	Tri-County Resta	30183	12807	2/1/2006	6	1,876
Spectronic Colorometer	Sargent Welch	30183	12845	12/13/2006	6	443
Spectronic Colorometer	Sargent Welch	30183	12845	12/13/2006	6	443
Spectronic Colorometer	Sargent Welch	30183	12845	12/13/2006	6	443
Digital Video Visualizer	Troxell Communi	30183	12845	11/29/2006	6	1,425
Spectronic Colorometer	Sargent Welch	30183	12845	12/13/2006	6	443
Fuel Surcharge	Fisher Scientific	35012	114	3/4/2011	1	4
Cat #01-915-13 Analytical Balances S	Fisher Scientific	35012	114	3/4/2011	1	2,328
Cat #01-915-13 Analytical Balances S	Fisher Scientific	35012	114	3/4/2011	1	2,328
Cat #01-915-13 Analytical Balances S	Fisher Scientific	35012	114	3/4/2011	1	2,328
Cat #01-915-13 Analytical Balances S	Fisher Scientific	35012	114	3/4/2011	1	2,328
Fuel Surcharge	Fisher Scientific	35012	114	3/4/2011	1	2,328
Cat #01-915-13 Analytical Balances S	Fisher Scientific	35012	114	3/4/2011	1	4
Shipping	Gow Mac Instru	39031	445	2/23/2012	0	-25
Shipping	Gow Mac Instru	39031	445	2/23/2012	0	25
Part # 70-CLA-2 Clarity Lite Chromato	Gow Mac Instru	39031	445	2/28/2012	0	3,057
Part # 70-CLA-2 Clarity Lite Chromato	Gow Mac Instru	39031	445	2/28/2012	0	3,057
Part # 70-CLA-2 Clarity Lite Chromato	Gow Mac Instru	39031	445	2/23/2012	0	-3,057
Part # 70-CLA-2 Clarity Lite Chromato	Gow Mac Instru	39031	445	2/23/2012	0	3,057
Part # 70-CLA-2 Clarity Lite Chromato	Gow Mac Instru	39031	445	2/23/2012	0	3,057
Shipping	Gow Mac Instru	39031	445	2/28/2012	0	25
Part # 70-CLA-2 Clarity Lite Chromato	Gow Mac Instru	39031	445	2/23/2012	0	-3,057
Subtotal Inventory for Chemistry, General				**60**		**100,309**

Although more accurate than the inventory included in last year's Program Review, the above inventory is still a work in progress. Many items are still missing and seem to have been placed in other departments inventory in Banner. The department will continue to work to improve the accuracy of our equipment inventory. The department estimates the total value of equipment in our area at $300000.

3C3: Interpretation of the Program Productivity Information

Chemistry: Productivity Changes

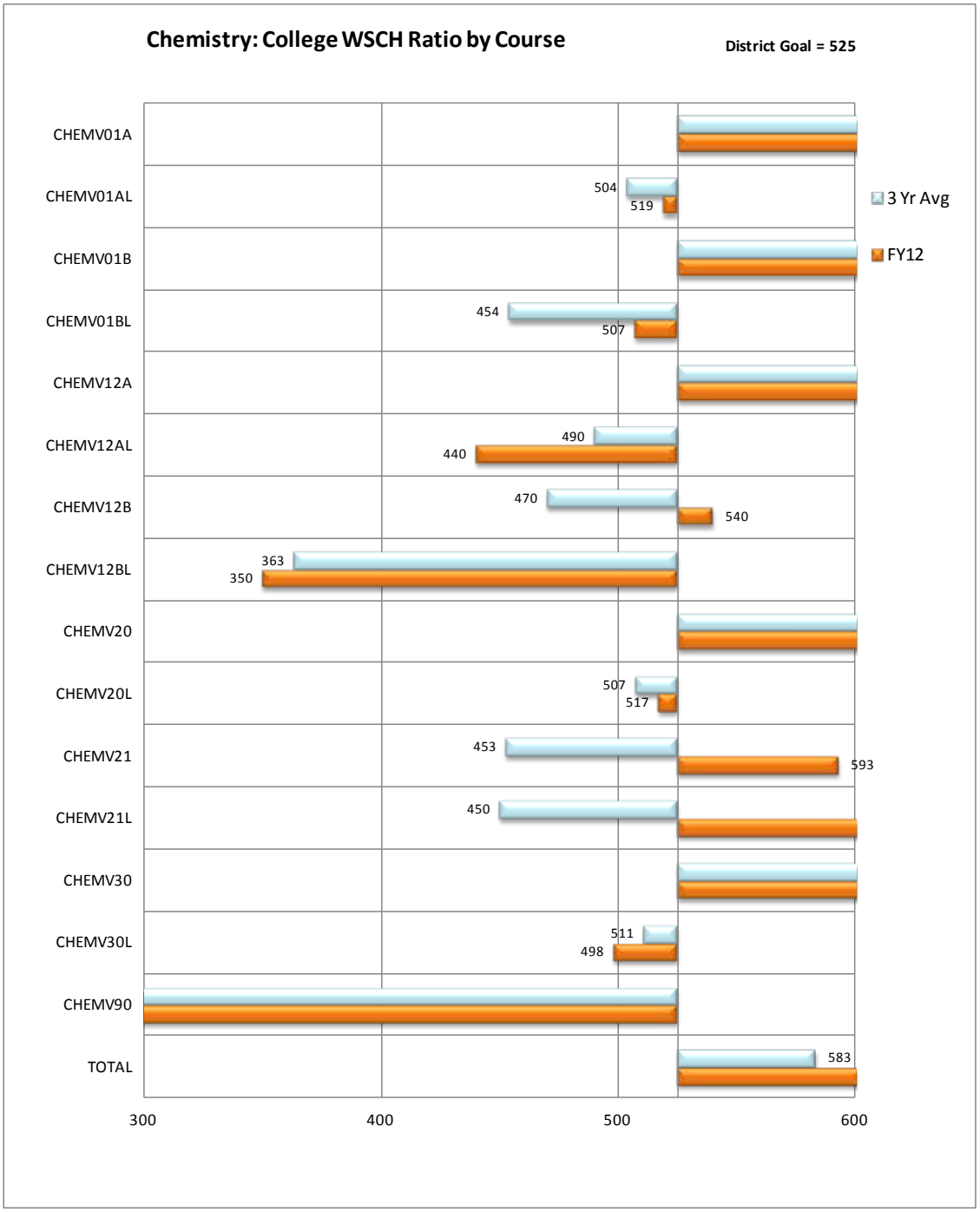
Title	FY09	FY10	FY11	3 Year Average	FY12	Program Change	College Change
Sections	74	75	76	75	78	4%	-11%
Census	2,653	2,781	2,852	2,762	2,933	6%	-8%
FTES	340	360	373	358	383	7%	-6%
FT Faculty	2.96	4.27	4.12	4	4.00	6%	10%
PT Faculty	4.75	3.90	4.35	4	4.54	5%	-12%
XL Faculty	1.17	1.08	0.97	1	1.02	-5%	-24%
Total Faculty	8.88	9.25	9.43	9	9.56	4%	-5%
WSCH	5,100	5,400	5,595	5,365	5,745	7%	-6%
WSCH/Faculty	574	584	593	584	601	3%	-2%



The 3C3 Chart and the 3C3 Graph indicate that the program offerings have increased by 4 % from 74 sections to 78 sections per year over the last four years. The department has seen a larger increases in FTES of 7%, which resulted the WSCH/FTEF ratio continuing its upward trend to 601 (3 % increase). This is above the district goal of 525 and is especially strong given that our lab sections are capped at 24 due to safety and equipment issues. In addition, this far exceeds the WSCH/FTEF ratio of Chemistry departments at Moorpark and Oxnard Colleges. The department FT/PT ratio declined in FY12 and now more than half of the department's classes are taught by part-time faculty who are often difficult to find.

3C4: Interpretation of the Program Course Productivity Information

College WSCH Ratio: Weekly Student Contact Hours/(FT FTE + PT FTE + XL FTE)									
Course	Title	FY09	FY10	FY11	3 Yr Avg	FY12	Change	Dist Goal	% Goal
CHEMV01A	General Chemistry I	1,032	1,103	1,106	1,080	1,123	43	525	214%
CHEMV01AL	General Chemistry I Lab	492	507	512	504	519	15	525	99%
CHEMV01B	General Chemistry II	705	850	880	812	970	158	525	185%
CHEMV01BL	General Chemistry II Lab	415	490	457	454	507	53	525	97%
CHEMV12A	General Organic Chemistry I	450	750	735	645	675	30	525	129%
CHEMV12AL	Gen Organic Chemistry I Lab	560	460	450	490	440	(50)	525	84%
CHEMV12B	General Organic Chemistry II	420	480	510	470	540	70	525	103%
CHEMV12BL	Gen Organic Chemistry II Lab	460	310	320	363	350	(13)	525	67%
CHEMV20	Elementary Chemistry	1,115	1,112	1,107	1,111	1,077	(34)	525	205%
CHEMV20L	Elementary Chemistry Lab	489	523	510	507	517	10	525	98%
CHEMV21	Intro to Organic&Biochemistry	465	420	473	453	593	140	525	113%
CHEMV21L	Organic & Biochemistry Lab	450	430	470	450	640	190	525	122%
CHEMV30	Chemistry for Health Sciences	1,238	1,125	1,182	1,182	1,144	(38)	525	218%
CHEMV30L	Chem for Health Sciences Lab	528	492	512	511	498	(13)	525	95%
CHEMV90	Directed Studies: Chemistry	-	-	-	-	-	-	525	0%
TOTAL	**Annual College WSCH Ratio**	575	583	592	583	602	19	525	115%

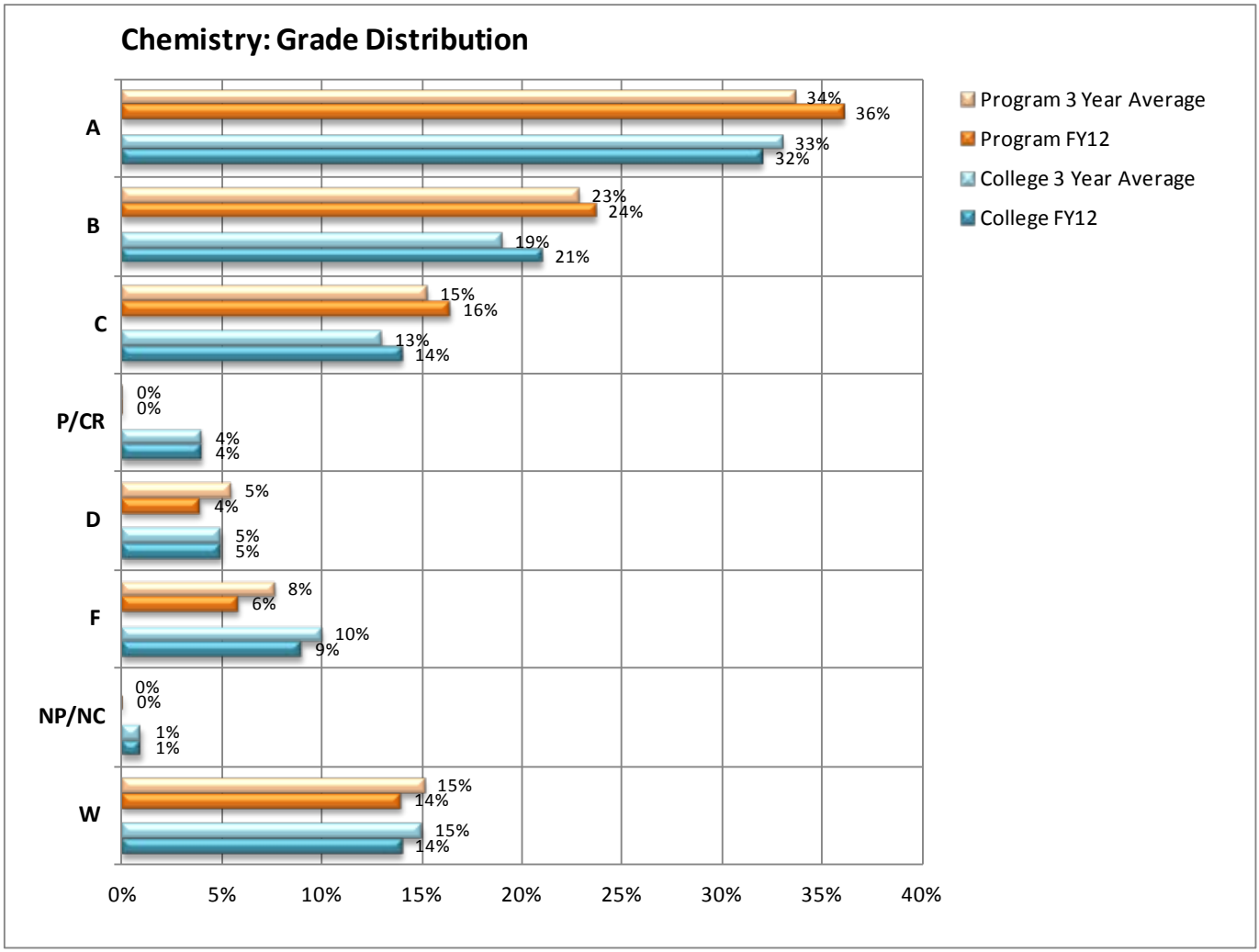


The departments over all WSCH/FTEF ratio is 601 which is 115% of the districts goal. As to be expected, the WSCH/FTEF ratio is higher for lecture classes with enrollments capped at 73 students than for lab classes which are capped at 24 students. Enrollment growth was strongest in Chem V21 and Chem V21L and Chem V1B and Chem V1BL, but otherwise changes in enrollments are relatively small and no discernable pattern is observed.

3C5: Interpretation of Program Retention, Student Success, and Grade Distribution

Subject	Fiscal Year	A	B	C	P/CR	D	F	NP/NC	W	Graded	Completed	Success
CHEM	FY09	831	585	419	3	128	200	-	408	2,574	2,166	1,838
CHEM	FY10	911	604	386	3	161	204	-	448	2,717	2,269	1,904
CHEM	FY11	975	659	430	-	154	213	-	367	2,798	2,431	2,064
CHEM	3 Year Avg	906	616	412	2	148	206	-	408	2,696	2,289	1,935
CHEM	FY12	1,032	678	470	2	113	167	2	400	2,864	2,464	2,182

Subject	Fiscal Year	A	B	C	P/CR	D	F	NP/NC	W	Graded	Completed	Success
CHEM	FY09	32%	23%	16%	0%	5%	8%	0%	16%	100%	84%	71%
CHEM	FY10	34%	22%	14%	0%	6%	8%	0%	16%	100%	84%	70%
CHEM	FY11	35%	24%	15%	0%	6%	8%	0%	13%	100%	87%	74%
CHEM	3 Year Avg	34%	23%	15%	0%	5%	8%	0%	15%	100%	85%	72%
CHEM	FY12	36%	24%	16%	0%	4%	6%	0%	14%	100%	86%	76%
College	**3 Year Avg**	**33%**	**19%**	**13%**	**4%**	**5%**	**10%**	**1%**	**15%**	100%	**85%**	**69%**
College	FY12	32%	21%	14%	4%	5%	9%	1%	14%	100%	86%	71%



Student success and completion rates in Chemistry are higher than the prior three year average of the program with the success rate up 4 % in FY12 over the department's prior three year average. The department's success rates continue to be higher than the College's as a whole as well (by 5 %) , 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 are skewed slightly higher than those of the college with 36% 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 polices among instructors. The department intends to address this by establishing a more standardized assessment of student achievement (See initiatives). Lab grades are generally higher than lecture grades due to the cooperative learning environment in the lab and this may also be responsible for skewing the grade distribution.

3C6: Interpretation of the Program Completion Information

CHEM: Student Certificates and Degrees

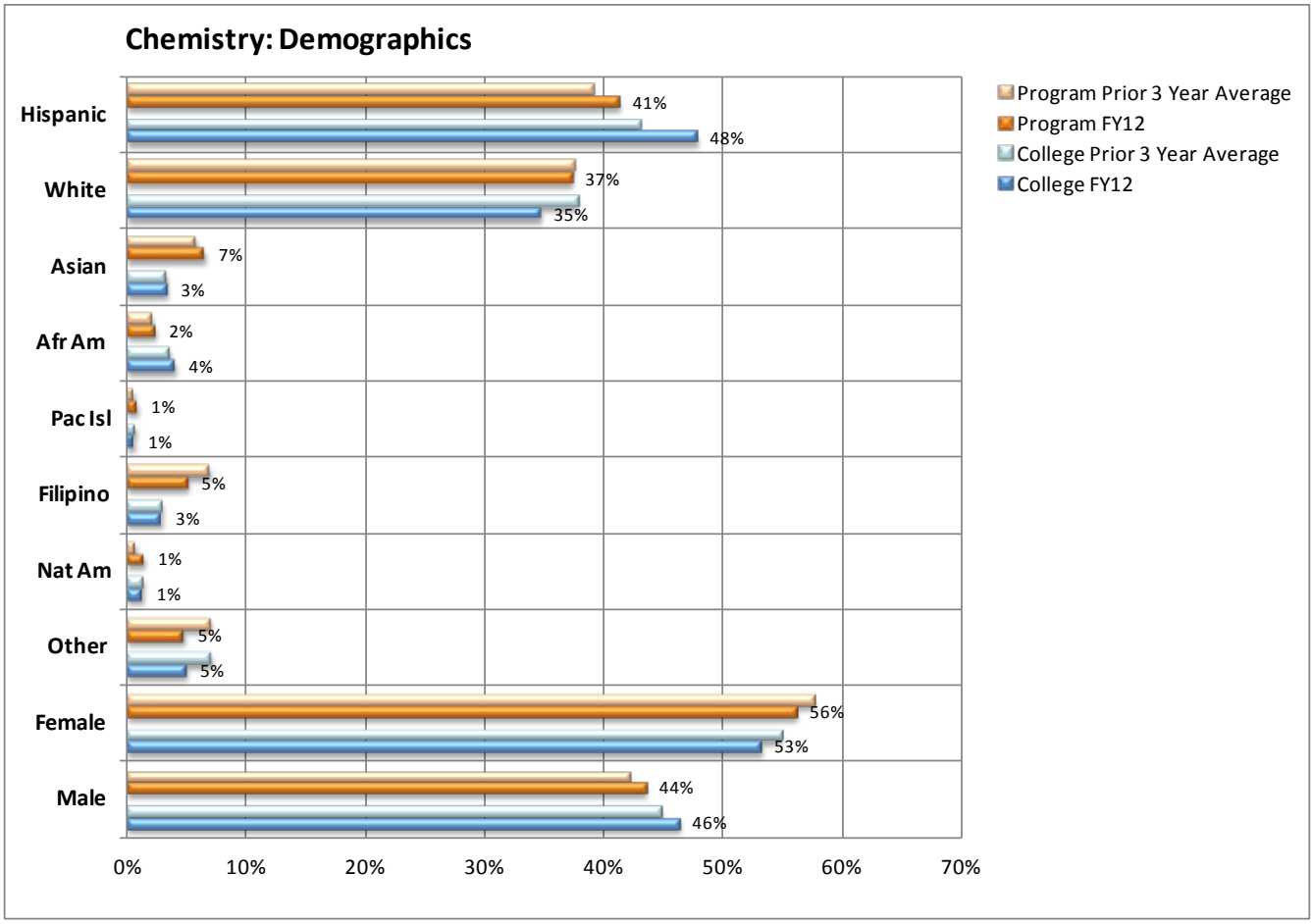
Program	FY	Certificates	Degrees	Female	Male
CHEM	FY09	-	-	-	-
CHEM	FY10	-	-	-	-
CHEM	FY11	-	-	-	-
CHEM	FY12	-	-	-	-
Total Awards in 4 Years		**-**	**-**	**-**	**-**

N/A

3C7: Interpretation of the Program Demographic Information

Subject	FY	Hispanic	White	Asian	Afr Am	Pac Isl	Filipino	Nat Am	Other	Female	Male	Other	Avg Age
CHEM	FY09	968	922	145	71	19	200	25	228	1,531	1,034	13	26
CHEM	FY10	1,089	1,027	162	51	14	168	18	188	1,519	1,195	3	25
CHEM	FY11	1,110	1,085	166	50	18	197	20	152	1,614	1,183	1	25
CHEM	**3 Year Avg**	**1,056**	**1,011**	**158**	**57**	**17**	**188**	**21**	**189**	**1,555**	**1,137**	**6**	**25**
CHEM	FY12	1,184	1,070	188	69	26	147	42	138	1,610	1,248	6	24
College	**3 Year Avg**	**12,714**	**11,174**	**990**	**1,074**	**223**	**880**	**414**	**2,110**	**16,221**	**13,261**	**97**	**27**
College	FY12	13,598	9,875	966	1,157	183	842	390	1,424	15,137	13,183	115	25

Subject	FY	Hispanic	White	Asian	Afr Am	Pac Isl	Filipino	Nat Am	Other	Female	Male	Other	Avg Age
CHEM	FY09	38%	36%	6%	3%	1%	8%	1%	9%	59%	40%	1%	26
CHEM	FY10	40%	38%	6%	2%	1%	6%	1%	7%	56%	44%	0%	25
CHEM	FY11	40%	39%	6%	2%	1%	7%	1%	5%	58%	42%	0%	25
CHEM	**3 Year Avg**	**39%**	**37%**	**6%**	**2%**	**1%**	**7%**	**1%**	**7%**	**58%**	**42%**	**0%**	24
CHEM	FY12	41%	37%	7%	2%	1%	5%	1%	5%	56%	44%	0%	24
College	**3 Year Avg**	**43%**	**38%**	**3%**	**4%**	**1%**	**3%**	**1%**	**7%**	**55%**	**45%**	**0%**	**27**
College	FY12	48%	35%	3%	4%	1%	3%	1%	5%	53%	46%	0%	24



The ethnic and gender distribution in Chemistry has remained relative constant over the past three years and roughly mirrors the college as a whole. The percent of Hispanic students is somewhat lower than the College as a whole, and the department is working with CSUCI on its STEM grant which has increasing minorities in science as one of its goals. Given the historical underrepresentation of women in chemistry, we continue to experience strong enrollment of female students. In fact, the department has a higher percentage of women than the college as a whole.

4. Performance Assessment

4A1: 2012-2013 Institutional Level Student Learning Outcomes

Institutional Level Student Learning Outcome 1	Performance Indicators
Communication	Per the College's schedule, this ISLO will not be assessed by the Chemistry Department this year. An assessment will be scheduled in future.
Operating Information	
Analysis – Assessment	

Institutional Level Student Learning Outcome 2	Performance Indicators
Reasoning – Scientific and Quantitative	80 % of students will reach a satisfactory or higher level according to the institutional rubric.
Operating Information	
This ISLO will be assesses in FY13 in the following courses: Chem V1aL, Chem V1bL, Chem V12aL, Chem V12bL, Chem V20L, Chem V21L and Chem V30L	
Analysis – Assessment	
This ISLO has not been assessed.	

Institutional Level Student Learning Outcome 3	Performance Indicators
Critical Thinking and problem solving	Per the College's schedule, this ISLO will not be assessed by the Chemistry Department this year. An assessment will be scheduled in future.
Operating Information	
Analysis – Assessment	

Institutional Level Student Learning Outcome 4	Performance Indicators
Information Literacy	This ISLO will not be assessed by the Chemistry department.
Operating Information	
Analysis – Assessment	

Institutional Level Student Learning Outcome 5	Performance Indicators
Personal/community awareness and academic / career responsibilities	This ISLO will not be assessed by the Chemistry department.
Operating Information	
Analysis – Assessment	

4A2: 2012-2013 Program Level Student Learning Outcomes - *For programs/departments offering degrees and/or certificates*

Program-Level Student Learning Outcome 1	Performance Indicators
Operating Information	
Analysis – Assessment	

Program-Level Student Learning Outcome 2	Performance Indicators
Operating Information	
Analysis – Assessment	

Program-Level Student Learning Outcome 3	Performance Indicators
Operating Information	
Analysis – Assessment	

Program-Level Student Learning Outcome 4	Performance Indicators
Operating Information	
Analysis – Assessment	

Program-Level Student Learning Outcome 5	Performance Indicators
Operating Information	
Analysis – Assessment	

4A3: 2012-2013 Course Level Student Learning Outcomes - *Refer to TracDat*

4B: 2012-2013 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 85%. Chemistry's FY12 retention rate was 86%. (Table 3C5)	
Analysis – Assessment	
In FY 12 Chemistry student retention rate was 1% 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 FY12 retention rate was 86%. (Table 3C5)	

Analysis – Assessment
Chemistry student retention rate in FY 12 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. The department is concerned that end of Ventura Colleges STEM grant could adversely impact our success in this area however. The STEM grant provided tutoring, and financial aid, among other services.

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 72%. Chemistry's FY12 success rate was 76%. (Table 3C5)

Analysis – Assessment
In FY 12 the Chemistry student success rate was 4% greater than the program average for the prior three years. The Chemistry department is on track with serving the needs of the students and improving student success. Tutoring is offered through the Tutoring Center for all levels of chemistry although students report some lack of availability of tutors. 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 69%. Chemistry's FY11 retention rate was 76%. (Table 3C5)
Analysis – Assessment
In FY 12, the Chemistry student success rate was 7% 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.

4C. 2012-2013 Program Operating Outcomes

Program Operating Outcome 1	Performance Indicators
The department will maintain WSCH/FTEF above the 525 goal set by the district.	The department will exceed the WSCH/FTEF goal of 525 by prudent scheduling of classes.
Operating Information	
In FY12, the department was at a WSCH/FTEF ratio of 601 or 115% of the goal.	
Analysis – Assessment	
The goal was meet. The current schedule is efficiently using resources to enroll students although students are often turned away from classes due to lack of space.	

Program Operating Outcome 2	Performance Indicators
The department will have an inventory of instructional equipment that 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	A current inventory of all equipment in the program will be maintained, and service contracts will be used to keep equipment in working order. A schedule for service life and replacement of outdated equipment will reflect the total cost of ownership.

developed. Service contracts for equipment valued over $5,000 will be budgeted if funds are available.	

Operating Information

An inventory from Banner is included in this Program Review.

Analysis – Assessment

While the accuracy of the inventory has been improved, the inventory is still not complete and staff time needs to be devoted to improving it. In addition, the many items in the department lack service contracts and are often down for repair for significant periods of time. A plan to address the total cost of ownership also needs to be developed.

Program Operating Outcome 3	Performance Indicators
The Chemistry Program will continue to improve its curriculum and learning environment. The program will review curriculum and assess equipment needs including maintenance, to assure that student needs are being met.	Curriculum will be reviewed and updated in Curricunet. Course topics will be modified as necessary for articulation and to improve student success.

Operating Information

All courses have been updated in Curricunet in line with the College schedule. Faculty review course content and materials as part of the update process.

Analysis – Assessment

All course outlines are current. During the course review process, the need to update and modify topics in laboratory courses was discovered in many of the lab classes we offer.

Program Operating Outcome 4	Performance Indicators
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.	The Full-time/Part-Time FTEF ratio should be maintained at two to one to provide student access to instructors and to improve course continuity.
Operating Information	
In FY12, 45% of classes were taught by full-time faculty. This goal was not meet.	
Analysis – Assessment	
The FT/PT has declined slightly over the last several years and now over half the departments classes are taught by part-time faculty. This has presented several challenges to the department including scheduling, difficulty in finding qualified faculty and lack of continuity in classes. The department may in the future request the addition of a full-time faculty member but the College's budget challenges appears to preclude such a request at this time.	

4D. Program Review Rubrics for Instructional Programs

Academic Programs

Point Value	Element	Score
Up to 6	Enrollment demand	
Up to 6	Sufficient resources to support the program (ability to find qualified instructors; financial resources; equipment; space)	
Up to 4	Agreed-upon productivity rate	
Up to 4	Retention rate	
Up to 3	Success rate (passing with C or higher)	
Up to 3	Ongoing and active participation in SLO assessment process	
Total Points	**Interpretation**	
22 – 26	Program is current and vibrant with no further action recommendation	
18 – 21	Recommendation to attempt to strengthen the program	
Below 18	Recommendation to consider discontinuation of the program	

TOTAL

CTE Programs

Point Value	Element	Score
Up to 6	Enrollment demand	
Up to 6	Sufficient resources to support the program (ability to find qualified instructors; financial resources; equipment; space)	
Up to 6	Program success (degree / certificate / proficiency award completion over 4 year period)	
Up to 4	Agreed-upon productivity rate	
Up to 4	Retention rate	
Up to 4	Employment outlook for graduates / job market relevance	
Up to 3	Success rate (passing with C or higher)	
Up to 3	Ongoing and active participation in SLO assessment process	

Total Points	Interpretation
31 - 36	Program is current and vibrant with no further action recommendation
25 - 30	Recommendation to attempt to strengthen the program
Below 25	Recommendation to consider discontinuation of the program

5. Findings

2012-2013 - FINDINGS

Finding 1: The chemistry program is exceeding its 525 efficiency goal set by the district. (See Section 3 - Operating Information: Table 3.C4, and Student Success Outcomes 1 and 2.) The chemistry department's schedule is an efficient use of resources, and is serving students well. Student completion and student success rates are high and above the departments goal. In order to continue excellence in this area, SI and tutoring resources need to be increased for our large lecture classes.

Finding 2: The gas chromatograph (GC) in the organic chemistry laboratory is in need of a service contract to avoid continued gaps in service. The GC has been operable the entirety of this semester so far.

Finding 3: The curriculum is current and is meeting the needs of the students in lecture classes; however, the curriculum in some lab classes, particularly in General Chemistry II (Chem V01BL), is outdated and does not include modern chemistry techniques. Laboratory curriculum should be revised to improve student success and engagement.

Finding 4: Limited availability of glassware and chemicals is beginning to negatively effect the learning environment in laboratory classes and the success of students in mastering chemical techniques.

Finding 5: An analysis of assessments used in courses and grade distributions show some lack of consistency regarding expectations for student achievement especially in lower level chemistry courses.

6. Initiatives

6A: 2011-2012 - FINAL Program Initiative Priority Ratings

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.)	

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)

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)	
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.)	

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
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)	
Requires college facilities funds	
Requires other resources (grants, etc.)	

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 in 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 heavy 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.)	

Chemistry Program Review
2012-2013

Line Number	Program	Category	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	Adjusted Cost	Accumulated Costs	Full Time or Part Time
1	Chemistry	None	0	H			CHEM1204	Increase standardization of student assessment in multi-section classes.	Development of standardized assessment tools and rubrics for laboratory classes			-	
2	Chemistry	Personnel	1	H		M	CHEM1202	Improve student access to technology in the Elementary Chemistry Laboratory	Student worker to prepare samples for student analysis	4,000	4,000	4,000	
3	Chemistry	Technology	1	H	H	**H**	CHEM1202	Improve student access to technology in the Elementary Chemistry Laboratory	Nine computers, visualizer, and a data projector	11,000	2,000	6,000	
4	Chemistry	Technology	2	M	H	**H**	CHEM1201	Improve Instrumentation in Organic Chemistry Laboratory	Software update for Gas Chromatogram	6,000	6,000	12,000	
5	Chemistry	Budget	2	L		M	CHEM1201	Improve Instrumentation in Organic Chemistry Laboratory	Service Contract for Gas Chromatogram	2,200	2,200	14,200	
6	Chemistry	Personnel	3	M		M	CHEM1203	Increase student support resources (see SI1202)	SI tutors and increase in tutors at tutoring center	5,000	5,000	19,200	
7	Chemistry	Technology	3	L	M	**H**	CHEM1203	Increase student support resources.	video cameras and software for development of online resources	1,500	1,500	20,700	

6B: 2012-2013 INITIATIVES

Initiative ID should be consistent. For example:
2011-2012 identified initiatives - ART1201, ART1202, etc.
2012-2013 identified initiatives - ART1301, ART1302, etc.
I
nitiative : Improve reliability of instrumentation in Organic Chemistry Lab. (modified)
Initiative ID: CHEM1-12 (modified)

Links to Finding 2: 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 is in need of a service contract to give regular maintenance to this instrument.
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: Gas chromatogram service contract ($2500/year)
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.)	

Initiative: Increase student support services
Initiative ID: CHEM3-12 (modified)

Links to Finding 1: 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. The department, as well as the College as a whole, has seen a drop in the average age of its students and many students appear to have difficulty as they transition from high school to our first semester chemistry class (Chem V01A). 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 SLOs given the appropriate support.
Request for Resources:
Five Supplemental Instructors for General Chemistry I (CHEM V01A) chemistry courses
$4000/year
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.)	

Initiative : Increase standardization of student assessment in multi-section classes.
Initiative ID: CHEM4-12
Links to Finding 5: 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 heavy 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. Some progress has been on this since the last Program Review, but addition work in this area is needed.
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)	x
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	
Requires computer equipment funds (hardware and software	
Requires college equipment funds (other than computer related	
Requires college facilities funds	
Requires other resources (grants, etc.)	

Initiative Update of General Chemistry II (Chem V1BL) curriculum
Initiative ID: CHEM1-13
Links to Finding 3: The General Chemistry II (Chem V01BL) curriculum is severely out of date and in need of revision. The curriculum lacks any modern chemical instrumentation which should be incorporated in order for the course to continue to articulate well with other colleges and universities. In addition, the experiments are very repetitive and do not stimulate student interest which may be negatively effecting the student success and completion rates for the class. One faculty member will be working on revising the curriculum in Spring 2013 as a sabbatical project. Additional financial resources are needed as start up costs while incorporating novel experiments into the curriculum.
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.
Incorporation of modern techniques will better engage students and prepare them for transfer.
Request for Resources:
Supply and Equipment increase to buy chemicals, glassware and other equipment $5000 (one time)
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.)	

Initiative: Provide greater access to equipment and samples in laboratory courses
Initiative ID: CHEM2-13

Links to Finding 4: In order to improve students' ability to measure chemical quantities accurately, the department has developed several strategies to aid student performance. Students would greatly benefit by repeating analysis more frequently and having access to enough equipment to work individually on experiments instead of large groups. The department requires a supply budget increase in order to facilitate more hands on student learning in our lab courses

Benefits: Using better equipment 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:

Increase in supply budget of 25 % to keep up with the growth in student population (6%), inflation (15 %) and restore cuts to the supply budget (5%) over the last three years. Cost $4000
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.)	

Initiative: Increase access to student lab samples and improve the laboratory environment.
Initiative ID: CHEM3-13

Links to Finding 4:. Students would greatly benefit by repeating analysis more frequently and having access to enough samples to work individually on experiments instead of large groups. The department requires addition funding to hire a student worker to prepare samples and to be available during the evening hours to support lab instructors in preparing the lab room, and preparing items as needed.

Benefits: 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: Increase in student hourly funding $2000

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.)	

6C: 2012-2013 Program Initiative Priority Ratings

Program	Finding Number	Category	Program Priority (R, H, M, L)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost
Chem		Budget	H				Chem1-12	Improve reliability of instrumentation in Organic Chemistry Lab.	Service Contract for Gas Chromatograph	$2500
Chem		Budget	H				Chem1-13	Update of General Chemistry II Lab (Chem 1VBL) Curriculum, equipment and materials	Supplies and Equipment to institute curriculum changes in lab	$5000 (one time)
Chem		Budget	M				Chem2-13	Increase in department supply budget	Increase in department supply budget	$4000 (on going)
Chem		Personal	M				Chem3-12	Add SI tutoring to General Chemistry (ChemV1A)	Provide SI tutors to Chem 1A students (5 sections per year)	$4000
Chem		Personal	L				Chem3-13	Increase access to student lab samples and improve laboratory environment.	Increase student worker hours to prepare samples	$2000
Chem			L				Chem 4-12	Increase standardization of student assessment in multi-section classes	Collaborate on common rubrics	None

6D: PRIORITIZATIONS OF INITIATIVES WILL TAKE PLACE AT THE PROGRAM, DIVISION, COMMITTEE, AND COLLEGE LEVELS:

Program/Department Level Initiative Prioritization
All initiatives will first be prioritized by the program/department staff. Prioritize the initiatives using the **RHML** priority levels defined below.

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 will then be prioritized using the **RHML** priority levels defined below.

Committee Level Initiative Prioritization
The division's spreadsheets will be prioritized by the appropriate college-wide committees (staffing, technology, equipment, facilities) using the **RHML** priority levels defined below.

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 **RHML** priority levels defined below.

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

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

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

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

7. Process Assessment and Appeal

7A. Purpose of Process Assessment

The purpose of program review assessment is to evaluate the process for continual improvement. The process is required for accreditation and your input is very important to us as we strive to improve.

7B. 2012 - 2013 ASSESSMENT QUESTIONS

1. Did you complete the program review process last year, and if so, did you identify program initiatives?

Yes, the department completed the program review process last year and identified four initiatives with seven components.

2a. Were the identified initiatives implemented?

Of the following, numbers 1, 3, 4, and 7 has been mostly implemented. Faculty have meet to develop standard assessments in some classes (1) but it is an ongoing process. There have been delays with installing computers and the data projector in the Elementary Chemistry Lab (3) and the work is partially done. The software update for the GC has been installed (4) but more training will be required to full implement it into the curriculum. The video cameras have been purchased (7) and are being used for the first time this semester.
Numbers 2, 5, and 6 were not funded last year and have been incorporated into new initiatives.

Chemistry Program Review
2012-2013

Line Number	Program	Category	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	Adjusted Cost	Accumulated Costs	Full Time or Part Time
1	Chemistry	None	0	H			CHEM1204	Increase standardization of student assessment in multi-section classes.	Development of standardized assessment tools and rubrics for laboratory classes			-	
2	Chemistry	Personnel	1	H		M	CHEM1202	Improve student access to technology in the Elementary Chemistry Laboratory	Student worker to prepare samples for student analysis	4,000	4,000	4,000	
3	Chemistry	Technology	1	H	H	**H**	CHEM1202	Improve student access to technology in the Elementary Chemistry Laboratory	Nine computers, visualizer, and a data projector	11,000	2,000	6,000	
4	Chemistry	Technology	2	M	H	**H**	CHEM1201	Improve Instrumentation in Organic Chemistry Laboratory	Software update for Gas Chromatogram	6,000	6,000	12,000	
5	Chemistry	Budget	2	L		M	CHEM1201	Improve Instrumentation in Organic Chemistry Laboratory	Service Contract for Gas Chromatogram	2,200	2,200	14,200	
6	Chemistry	Personnel	3	M		M	CHEM1203	Increase student support resources (see SI1202)	SI tutors and increase in tutors at tutoring center	5,000	5,000	19,200	
7	Chemistry	Technology	3	L	M	**H**	CHEM1203	Increase student support resources.	video cameras and software for development of online resources	1,500	1,500	20,700	

2b. Did the initiatives make a difference?

Due to most of these initiatives being works in progress, it is hard to quantify the difference they have made. Most of these resources are being use for the first time this semester, but the department believes they will help student success and understanding of topics.

3. If you appealed or presented a minority opinion for the program review process last year, what was the result? *N/A*

4. How have the changes in the program review process worked for your area? *The department is much more collaborative and is looking at our successes and failures in greater detail. All of this is a positive for us as a department.*

5. How would you improve the program review process based on this experience?

Give the department more time to work on this document perhaps during Flex Week.

7C. 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 appropriate form that explains and supports your position. Forms are located at the Program Review VC website.

The appeal will be handled at the next higher level of the program review process.

Chemistry Course Level Student Learning Outcomes

Chem V01A:

1. Balance Chemical equations and solve general Chemistry problems by applying the scientific method including developing hypotheses, hypotheses testing and evaluation.

2. Calculate quantities involving Chemical equations including using Chemical symbols, IUPAC nomenclature, balancing reactions and stoichiometry.

3. Use Chemical concepts such as enthalpy, VSEPR theory, changes of state, and colligative properties to determine the physical properties of substances.

Assessment Methodologies

1. Weekly written mathematical homework requiring multi-step problem solving
2. Written explanations of the underlying theories of physical phenomenon discussed in class
3. Mid-term and final exams

Chem V01AL:

1. Understand laboratory procedures, safety, scientific method and lab notebook recording.

2. Understand the concepts of random error, systematic error, precision and accuracy, and their relationship to significant figures.

3. Master Chemical laboratory techniques such as measurement, determination of density, pipetting, titration, and spectroscopy.

Assessment Methodologies

1. Obtainment of reasonable values for physical properties of matter using common laboratory equipment.
2. Written reports requiring the student to describe the success (or failure) of their physical skills and to integrate the results into the theoretical background provided in lecture courses
3. The organization of data/observations into data tables which include proper labels and units.

Chem V01B

1. Use kinetic data to formulate chemical mechanisms and analyze the results using thermodynamic arguments.

2. Understand the concepts of equilibrium and the equilibrium constant as it pertains to acids, bases, titrations, and solubility product

3. Be able to apply the Nerst Equation to non-equilibrium systems and relate to thermodynamic priniples

Assessment Methodologies

1. Weekly written mathematical homework requiring multi-step problem solving
2. Written explanations of the underlying theories of physical phenomenon
3. Midterm exams and quizzes
4. Cumulative final requiring synthesis of material from multiple braches of chemistry

Chem V01BL

1. 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

2. Experiment with rate dependence on temperature and calculate activation energy from experimental data analysis.

3. Test common hydrocarbons and organic compounds to identify what functional groups are present.

Assessment Methodologies

1. Obtainment of the identification of unknowns using chemical analysis
2. Multipage written reports requiring the student to describe the success (or failure) of their physical skills and to integrate the results into the theoretical background provided in lecture courses
3. *Lab practical final required independent analysis of an unknown and measurement of its physical characteristics*

Chem V12A

1. Categorize, arrange, and assemble structures of alkanes, alkenes, alkynes, alkyl halides, cyclics, alcohols, and ethers using IUPAC and common systems of nomenclature.

2. Examine, evaluate, and formulate mechanisms for the reactions of alkanes, alkenes, alkynes, alkyl halides, cyclics, alcohols, and ethers given reactants and reagents.
3. Ability to propose the multi-step synthesis for common functional groups using learned reagents. (*heavy emphasis on synthesis*)
4. Evaluate spectra (Infrared & Mass Spec) to formulate structures for alkanes, alkenes, alkynes, alkyl halides, cyclics, alcohols, ethers, and ketones, aldehydes, carboxylic acids, esters, and aromatics.

Assessment Methodologies

1. Weekly written homework requiring multi-step problem solving
2. Midterm exams and quizzes
3. Cumulative final

Chem V12AL

1. Synthesize simple organic molecules using modern reaction techniques and analyze the success of each synthesis on the basis of gravimetric, spectroscopic, and chromatographic evidence and physical properties.

2. Analyze unknown substances using qualitative Chemical tests and to confirm the analysis using the interpretation of infrared, nuclear magnetic resonance, and gas chromatography-mass spectroscopy.

Assessment Methodologies

1. Correct identification of organic unknowns using chemical analysis and common laboratory equipment such as Gas Chromatography, IR spectrophotometer, and high performance liquid chromatomaotory
2. Written lab reports including the incorporation of standard chemical reference books such as the CRC Handbook to locate the physical and chemical properties of a set of given compounds

Chem V12B

1. Categorize, arrange, and assemble structures of aromatics, ketones, aldehydes, carboxylic acids, esters, amines, and biochemical amino acids using IUPAC and common systems of nomenclature; in addition to continued Chem V12A knowledge.
2. Examine, evaluate, and formulate mechanisms for the reactions of aromatics, ketones, aldehydes, carboxylic acids, esters, and amines given reactants and reagents; in addition to continued Chem V12A knowledge.
3. Ability to propose the multi-step synthesis for common functional groups using all learned reagents from Chem V12A and V12B. (*heavy emphasis on synthesis*)

4. Evaluate spectra (Infrared, Mass Spec, H^1 NMR, C^{13} NMR) to formulate structures for alkanes, alkenes, alkynes, alkyl halides, cyclics, alcohols, ethers, and ketones, aldehydes, carboxylic acids, esters, amines, and aromatics.

Assessment Methodologies

1 Weekly written homework requiring multi-step problem solving
2. Midterm exams and quizzes
3. Cumulative final

Chem V12BL

1. Synthesize organic molecules using modern reaction techniques and analyze the success of each synthesis on the basis of gravimetric, spectroscopic, and chromatographic evidence and physical properties.

2. Analyze unknown substances using qualitative Chemical tests and to confirm the analysis using the interpretation of infrared, nuclear magnetic resonance, and gas chromatography-mass spectroscopy.

Assessment Methodologies

1. Lab practical final required independent analysis of an organic unknown and measurement of its physical characteristics.
2. Written lab reports linking laboratory experiments with material from lecture classes.

Chem V20

1. Solve quantitative Chemistry problems using various mathematical procedures including dimensional analysis and algebraic equations, and demonstrate clear reasoning in their work.

2. Explain the basic structure of atoms and molecules and describe how atoms combine to form compounds.

3. Describe how the structure of atoms and molecules leads to the macroscopic properties of a material such as reactivity, boiling point, melting point, and polarity.

4. Analyze, predict, and represent chemical changes using knowledge of chemical formulas, solubility rules, periodic trends, stoichiometry, and chemical equations

Assessment Methodologies

1. Weekly written mathematical homework requiring problem solving

2. Midterm Exams and quizzes

Chem V20L

1. Perform laboratory techniques correctly following written protocols and using appropriate safety procedures.

2. Evaluate sources of error, and their effect on experiment results

3. Perform careful and accurate laboratory measurements and correlate these measurements with scientific laws, and the properties of substances.

Assessment Methodologies

1. Lab reports and *quizzes.*
2. Independently perform chemical reactions that involves changes in physical and chemical characteristics, such as color, temperature, and formation of precipitates
3. Solve for an unknown sample by qualitative or quantitative techniques.

Chem V21:

1. Solve organic and biochemistry problems by applying the scientific method including developing hypotheses, hypotheses testing and evaluation.

2. Know the IUPAC names and the structures of alkanes, alkenes, alkynes, alcohols, ethers, thiols, benzene and aromatic compounds, amines, aldehydes, ketones, carboxylic acids, esters, amides, acid anhydrides and polyfunctional molecules.

3. Understand the process of DNA replication, transcription, translation, mutation and polymerase chain reaction; as well as the processes of catabolism and anabolism.

Assessment Methodologies

1. Weekly written homework
2. Midterm Exams and quizzes
3. Cumulative final

Chem V21L:

1. Understand laboratory procedures, safety, scientific method and lab notebook recording.

2. Master techniques for organic Chemistry reactions, synthesis, chromatography and quantitative analysis.

3. Master biochemical laboratory procedures for isolating and identifying DNA.

Assessment Methodologies

1. Weekly lab reports and quizzes.
2. Students will be required to set up the equipment and perform the synthesis of organic compounds such as acetyl salicylic acid, and analyze their success mathematically and through chemical analysis

Chem V30

1. Describe the structure and composition of matter, and use knowledge of the particulate structure of matter in order to predict and explain macroscopic properties.

2. Solve quantitative Chemistry problems using dimensional analysis and algebraic equations involving the mole, pH, unit conversions, and other concepts.

3. Classify organic molecules, predict their properties based on their formula and structure, and represent their characteristic reactions.

Assessment Methodologies

1. Weekly written mathematical homework requiring problem solving
2. Midterm Exams and quizzes

Chem V30L

1. Perform laboratory techniques correctly following written protocols and using appropriate safety procedures.

2. Analyze the results of laboratory experiments quantitatively.

3. Perform experiments with organic compounds and use the results of these experiments to classify, and predict the behavior of organic compounds.

Assessment Methodologies

1. Weekly lab reports and quizzes.
2. Analysis of unknowns including accuracy and precision of the results.