Colorado State University – Pueblo Academic Program Assessment Report for AY 2012-2013

Program:_____Chemistry_____

Completed by:___David Lehmpuhl_____

Assessment contributors (other faculty involved in this program's assessment): ____All chemistry faculty______

Please complete this form for <u>each undergraduate</u>, <u>minor</u>, <u>certificate</u>, <u>and graduate program</u> (e.g., B.A., B.S., M.S.) in your department. Please copy any addenda (e.g., rubrics) and paste them in this document, and return it to Erin Frew, <u>erin.frew@colostate-pueblo.edu</u> as an email attachment before June 1, 2013. You'll also find the form at the assessment website at <u>http://www.colostate-pueblo.edu</u> as an email pueblo.edu/Assessment/Resources/Pages/default.aspx. Thank you.

I. Program student learning outcomes (SLOs) assessed in this cycle, processes, results, and recommendations.

A. Which of the	B. When	C. What	D. Who was	E. What is	F. What	G. What were the	H. What
program SLOs	was this	method was	assessed?	the	were the	department's	changes/improvements
were assessed	SLO last	used for	Please fully	expected	results of the	conclusions about	to the <u>program</u> are
during this	assessed?	assessing the	describe the	achievement	assessment?	student	planned based on this
cycle? Please		SLO? Please	student	level and		performance?	assessment?
include the		include a copy	group.	how many			
outcome(s)		of any rubrics		students			
verbatim from		used in the		should be at			
the assessment		assessment		it?			
plan.		process.					
1: Demonstrate	Data is	Evaluation of	All students	The average	All core	Overall, student	As described in the
knowledge of	collected	the results of	taking core	student	courses had	performance was	previous assessment
chemical	at the end	the American	chemistry	should be at	average	good and no major	plan, the department
concepts and	of every	Chemical	courses	or above the	demonstrate	changes seem to	engaged in additional
theories.	year for	Society	(General	50 th	d knowledge	be required.	assessment of
	each	Nationally	Chemistry,	percentile,	at or above	Although the	performance in general
	semester.	normed final	Organic	and 50% of	the 50 th	performance in	chemistry. It was
		exams in each	Chemistry,	the students	percentile	organic chemistry	determined that
		core course.	Analytical	should be at	except for	was slightly below	performance is well

Date: ___5/13

Due: June 1, 2013

			Chemistry, Instrumental Methods, Physical Chemistry, and Biochemistry)	it.	organic chemistry which came in at the 48 th percentile, and general chemistry which came in at the 42 nd percentile.	the 50 th percentile, it is statistically no different than the 50 th percentile based on the exam norms. The lower than expected performance in general chemistry mirrors last year's assessment and provides further evidence for the changes noted in column H.	correlated with Math and Overall ACT scores. Therefore college algebra was changed through CAPB from a co-requisite of the course to a pre- requsite for the course. The change will be evaluated during the AY 2013-14.
2: Demonstrate Problem Solving Skills	Data is collected at the end of every year for each semester.	The Major Field Achievement Test (MFAT)	Senior chemistry majors taking the Chem 493 Seminar course from 2011-12 and 2012-13 due to a new MFAT exam without norms in 2011-12.	The average student should be at or above the 50 th percentile and 50% of the students should be at it.	3 out of 9 students scored less than the 50 th percentile with the average of the cohort in the 69 th percentile.	The department's achievement level is expected to mirror the national distribution of student learning with half of students scoring above the 50 th percentile and half below the 50 th percentile. For this assessment period, the student learning demonstrated is significantly above this with only 33% of the students	The Chem 493 course was taught by different faculty each semester and the department communication about using the MFAT as an assessment tool was not as efficient as it could be (some faculty used the MFAT as part of the seminar course grade and some didn't). To ensure consistency the department will be establishing better communication of a common weighting of the assessment to student grades to ensure student

						scoring below the	compliance in the
						50 th percentile and	assessment process.
						66% scoring above.	
						The department is	
						quite happy with	
						the results.	
3: Evaluate,	Data is	All faculty	Senior	All students	All students	Although the	The scoring rubric that is
write and	collected	evaluate the	chemistry	should be at	scored	number of	given to faculty has no
present	at the end	senior seminar	majors	or above	above 80%	students during	performance level
chemical topics	of every	using a		70% on the	on the	this assessment	characteristics to it.
from the	semester.	common tool.		scoring	scoring	period was	Attached is a draft of
literature.				rubric.	rubric.	unusually small	performance level
						(n=3) they all	categories which will help
						showed better	in evaluating this SLO and
						than average	allow the department to
						learning (perhaps	improve it's assessment
						the small number	and hence the program in
						allowed better	the future. Because the
						instruction).	achievement level is
							deemed stringent enough
							and all students exceeded
							the achievement level, no
							programmatic changes
							are being made given the
							current assessment tool.

Comments:

B. Follow-up (closing the loop) on results and activities from previous assessment cycles. In this section, please describe actions taken during this cycle that were based on, or implemented to address, the results of assessment from previous cycles.

A. What SLO(s) did you address? Please include the outcome(s) verbatim from the assessment plan.	B. When was this SLO last assessed?	C. What were the recommendations for change from the previous assessment?	D. Were the recommendations for change acted upon? If not, why?	E. What were the results of the changes? If the changes were not effective, what are the next steps or the new recommendations?
3: Evaluate, write and present chemical topics from the literature.	2012	From the assessment report feedback: What are the specific criteria used by faculty in scoring CHEM 493 presentations? I think a rubric describing A level, B level, etc. performance on each item would give you more useful data.	A rubric was developed that includes categories of student learning that should be evident in the presentation corresponding to an appropriate evaluation.	The changes were not implemented before the student seminars this year and will be implemented in the 2013- 14 AY.
2: Demonstrate Problem Solving Skills	2012	The department will retroactively review the 2011-2012 student performance as measured by the MFAT when national statistics are available.	The students were evaluated and included in this year's assessment results.	No significant results other than completing the record of student performance for the department. Results indicate student learning is meeting the criteria established by the department.
1: Demonstrate knowledge of chemical concepts and theories.	2012	The department engaged in additional assessment of performance in general chemistry. It was determined that performance is well correlated with Math and Overall ACT scores (documentation attached). This has prompted the following action: 1. Review advising protocol with 1 st year program.	Regarding the third item, College Algebra was made a prerequisite rather than a co-requisite for General Chemistry and was approved by CAPB. The effects of this change will manifest during the 2012- 13 academic year.	The next step will be to evaluate student performance in General Chemistry to determine if students are more successful in passing the course and if student learning improves as measured by the standardized ACS final exam for the course.

Stressed importance to	
enforce pre- and co-	
requisite requirements.	
2. Evaluate how the recently	
revised math placement	
scores influence	
performance.	
3. Consider making MATH121	
a pre-requisite rather than a	
co-requisite.	

Addenda:

Chem 493 Seminar Rubric

Chem 493 Seminar Evaluation Sheet

Cumulative MFAT scores

Cumulative ACS core exam scores

Comments:

Chem 493: Seminar Assessment and Comments Rubric Categories

Topic:

A I I	Taxis is normally an available include an addition asterial while he vice hyperdate of interact. Taxis is highly
A Level	Topic is narrow enough to include specific material while having breadth of interest. Topic is highly
	chemical in nature.
B Level	Topic is good but either slightly too specific or too broad. Chemistry content is good.
C Level	Topic is too broad and may not contain enough chemistry
D Level	Topic contains little specific chemistry and is broad and non-specific or not appropriate for the
	audience.

Content:

A Level	The presentation contains sufficient chemistry and is relevant to the topic, correct, well- documented and current. Excellent handling of post-seminar questions. Speaker exhibits an excellent command of the topic.
B Level	The presentation contains a good amount of material with minimal tangents or dated material. Handled most post-seminar questions well. Speaker exhibits a good command of the subject with minimal corrections needed.
C Level	Presentation content is lacking significantly in one or more areas. Content questions handled erratically with additional preparation by the speaker needed to master the topic.
D Level	Presentation had little to no chemistry and showed little preparation or documentation. Failure to address questions and speaker showed little to no understanding of topic.

Organization:

A Level	Introduction provides a good overview and each topic flows naturally from the previous one. The presentation "tells a story" and at an appropriate level for the audience. Time management is excellent.
B Level	Introduction pertinent and attracted the audiences attention. A few transition problems and/or limited disorganization. Time management is good.
C Level	The "story" is somewhat disorganized. Introduction, transitions and topic flow is not smooth or refined. Seminar is overly long or short.
D Level	No organization evident with the audience quite lost. Poor transitions and topic flow. Extremely poor time management.

Presentation:

A Level	Presenter maintains excellent eye contact and appropriate strength of voice and engages the
	audience. Dress, posture pointer use and/or mannerisms are excellent. Speaks the presentation

	without reading slides.
B Level	Infrequent problems with voice tone, eye contact, posture, pointer use and/or mannerisms. Appropriate attire and audience engagement. Limited reading of slides.
C Level	Voice tone, eye contact, pointer use and/or mannerisms poor at times. Significant reading of slides. Attire and audience engagement needs improvement.
D Level	Consistently poor voice, eye contact, pointer use and/or mannerisms to the point of distraction for the listeners. Presentation was read.

Graphics, Diagrams, Figures:

A Level	Graphics, diagrams, figures and tables are all appropriate to the presentation, correct, discussed in detail and are easy to read and follow.
B Level	Most graphics are readable and pertinent to the presentation and discussed adequately. Some modification/addition of graphical data would have made the presentation more effective.
C Level	Insufficient use of graphics, diagrams, figures, etc. Multiple visual aids difficult to read, insufficiently explained or superfluous to the presentation.
D Level	No visual aids presented when it would have been appropriate. Visuals presented are unreadable, illegible, inappropriate and/or not discussed.

Use of PowerPoint:

A Level	All slides readable, attractive and well-organized. Color schemes/fonts appropriate and legible. Time spent on each slide appropriate. PowerPoint used as a tool for the presentation and not distracting from it. No typos or mistakes.
B Level	Most slides readable and generally follow presentation. Time spent on each slide could use slight improvement. Limited typos.
C Level	Some slides not readable or clear. Time management of slides poor. Numerous typos and/or mistakes on slides.
D Level	Overall slides not readable or clear and significant lack of organization on the slides evident. PowerPoint is a distraction rather than a presentation tool.



Seminar Assessment & Comments CHEM 493:

Seminar Score	
Abstract (%) 100 point scale	

Student Presenter _____

opic	Date						-
The objective of the 50 minute talk is to illustrate the stud	dent's ability to co	oherently	present i	nformatio	n of a sp	ecific nat	ure.
	A	A-	B-	C-	D	F	
Topic: (10 pts)Appropriateness of topic: narrow enough to include specific materials it of general interest?	10 ial while having bre	9 eadth of in	8 terest? Is i	7 it sufficien	6 tly chemi	5 cal in natu	re?
Content: (35 pts)	<u>A</u> 35	<u>A-</u>	<u>B-</u>	<u>C-</u>	D 21	F	_
Is there sufficient chemistry in the presentation? Is the material pre and logically presented?	sented relevant to t	he topic, c	orrect, wel	ll-documer	nted and c	urrent? Is	it <i>clear</i>
Organization: (20 pts)	<u>A</u>	<u>A-</u>	<u>B-</u>	C-	_ D	F	
Does the <i>introduction</i> provide a <i>good overview</i> ? Does each <i>topic fa</i> <i>material appropriate</i> for the intended audience?	low naturally form	the previou	us one? D	oes the pre	esentation	''tell a sto	ry"? Is
Dressoutstiens (20 st.)	<u>A</u>	A-	В	C-	D	F	
Does the presenter maintain good eye contact, and use appropriate	20 strength of voice, v	18 vhile <i>enga</i>	16 ging listen	14 ers?	12	10	
(40 min) Start time Stop time							
Graphics, Diagrams, Figures: (10 nts)	<u>A</u>	<u>A-</u>	<u>B-</u>	<u> </u>	D	<u>F</u>	
Do the visual aids supplement the presentation or are they superflue Are they easy to read and follow?	ous? Do visual aid:	s fit <i>logica</i>	<i>lly</i> into pre	esentation?	Are they	discussed	l in deta
Use of Power Point: (5 pts)	<u>A</u> 5	<u>A-</u> 5	<u>B-</u> 4	<u> </u>	 2	<u> </u>	_
How well was the visual presentation put together? (general appea	arance, clarity, and	legibility o	of slides; e	ffective use	e of Powe	r Point).	
General Impressions:							

Cumulative %tiles on Major Field Achievement Test

Institutional Performance %tile score

	# S	tudents	Ov	erall	Phy	vsical	Orgai	nic	Inor	ganic	Ana	lytical	National Mean
			current yr	cumulative									
semester	number	Cumulative	%tile	%-tile									
S 1995	5	5	77	77	72	72	71	71	78	78	84	84	50
S-1996	6	11	87	82	91	82	71	71	83	81	96	91	50
S-1997	7	18	49	69	52	71	48	62	65	75	25	65	49
AY 97-98	10	28	95	79	94	79	93	73	91	80	91	74	49
AY 98-99	6	34	46	73	9	67	44	68	51	75	68	73	49
AY 99-00	9	43	66	71	59	65	64	67	75	75	71	73	49
AY 00-01	9	52	44	67	51	63	40	62	32	68	54	70	49
AY 01-02	6	58	85	69	76	64	80	64	76	69	99	73	50
AY 02-03	2	60	75	69	75	64	75	65	80	69	60	72	50
AY 03-04	9	69	55	67	60	64	25	59	50	66	65	71	50
AY 04-05	6	75	80	68	75	65	65	60	85	68	85	72	50
AY 05-06	4	79	88	69	82	66	85	61	78	68	84	73	50
AY 06-07	5	84	35	67	50	65	10	58	45	67	50	72	50
AY 07-08	11	95	55	66	80	66	40	56	70	67	60	70	50
AY 08-09	10	105	25	62	40	64	10	52	60	67	25	66	45
AY 09-10	14	119	60	62	80	66	35	50	65	67	65	66	50
AY 10-11	7	126	55	61	80	67	25	48	55	66	80	67	50
AY 11-12	5	131	77	62	88	67	59	49	82	66	62	66	46
AY 12-13	4	135	60	62	60	67	58	49	67	67	36	66	51

								Pe	rcentile	Percentil	Differenc
ACS Final	Semester		Ra	w Score	e Averaç	ge		A۱	/erage	е	е
			Std.		CSU	Std.					
(Exam name & year)	Given	U.S.	Dev.	N =	-P	Dev.	N =	U.S.	CSU-P	Raw	Weighted
		Ge	neral Che	emistry	Exams						
1st term (2000) DL	Su 05	39.6	11		41.3	11.3	16	51	56	5	80
1st term (2000) LW	Fall 04	39.6	11		44	14	58	51	65	14	812
1st term (1997)LW				200							
	Fall 05	39	11	0	39	12	63	51	48	-3	-189
1st term (1997)LW				200						_	
	Fall 06	39	11	0	42	11	38	51	57	6	228
1st term (2000)LW	Fall 07	40	11		39	12	73	48	48	0	0
1st term (2005)LW		10	40	452	00	10	50	40	45	0	400
1 at tarm (2000) DE	Fall 08	40	12	4	38	10	56	48	45	-3	-168
Ast terms (2000) RF	F08	39.6	11		33.8	9.8	15	51	33	-18	-270
1st term (2000) DL	Su 07	39.6	11		39.1	10.4	16	51	49	-2	-32
1st term (2000) DL	Su 08	39.6	11		42.9	13.2	19	51	61	10	190
1st term (2000) DL	Su 09	39.6	11		45.9	15.1	10	51	70	19	190
1st term (2005) CK	Spring	40.3	40.00	452	32.0	40.04	05	50			4.400
	2010 Spring	5	12.26	4	5	10.91	65	50	28	-22	-1430
TSt term (2009) KP	Spring	27.4	11 /	382	20.2	11 6	74	51	E A	2	222
1st term (2009) RF	2010	57.1	11.4	382	30.2	11.0	74	51	54	3	222
	F10	37 1	11 4	7	38.2	12.2	33	51	54	З	99
1st term (2005) DL	110	40.3	11.4	452	45.0	12.2	00	01	04	U	00
	Su 10	5	12.26	4	8	11.09	22	50	63	13	286
1st term (2009) DD		37.1	-	382	-					-	
× ,	Su 11	3	11.39	7	36.8	10.3	26	51	50	-1	-26
1st term (2009) CC		37.1		382							
	F11	3	11.39	7	33.9	11.2	78	51	41.8	-9.2	-717.6
1st term (2009) CC		37.1		382							
	Sp12	3	11.39	7	34.3	10.7	90	51	42.9	-8.1	-729
1st term (2009) RF	F 10	37.1	44.00	382	07.4	0.1	74	F 4	50 5	0.5	05.5
	F12	3	11.39	(37.1	9.1	/1	51	50.5	-0.5	-35.5

American Chemical Society Standardized Final Examination Data Academic Year 2004- present

Full year (1999) I W		40.1									
Tuli year (1999) LVV	Spring 05	40.1 9	10.03	955	37.5	9.5	48	51	41	-10	-480
Full year (1999) RS	Fall 04	40.1 Q	10.03	955	42	127	33	51	59	8	264
Full year concept (2001) LW	Spring 05	33.1 40 1	11	000	31.9	9.9	49	53	48.5	-4.5	-220.5
Full year (1999) DD	Su 05	9 40.1	10.03	955	34.6	7.6	22	51	35	-16	-352
Full year (1999) RS	Fall 05	9 40.1	10.03	955	43.4	10.8	34	51	62	11	374
Full year (1999) LW	Spring 06	9	10.03	955	37	11	41	51	39	-12	-492
Full year concept (2001) LW Full year (1999) DD	Spring 06	33 40.1	10		33	11	39	53	53	0	0
Full year (2005)LW	Su 06	9	10.03	955 185	42.4	9.1	20	51	60	9	180
	Sp 07	35.5	11.5	8	32.2	9.5	47	52	43	-9	-423
Full year concept (2001) LW Full year (2005)LW	Sp 07	31.2	9.99	185	32.2	9.5	48	52	56	4	192
Full year (2005)LW	Su 07	35.5	11.5	8 185	37.7	12.6	11	52	61	9	99
	Sp 08	35.5	11.5	8	34	11	27	51	48	-3	-81
Full year concept (2001) LW Full year (2005)LW	Sp 08	31.2	9.99	185	35	11	26	53	60	7	182
	Sp 09	35.5	11.5	8	36	11	31	51	54	3	93
Full year concept (2001) LW Full year (2005) DL	Sp 09	31.2	9.99	185	34	14	31	53	56	3	93
Full year (2005) DL	Su 08	35.5	11.5	8 185	33	9.7	21	51	42	-9	-189
Full vear (2005) CK	Fall 08	35.5 35.4	11.5	8 185	34.1 36.8	16.4	23	51	48	-3	-69
Full vear (2005) DD	Su 09	5 35.4	11.51	8 185	5	14.09	20	51	58	7	140
Full year (2005) KP	Su10	5 34 7	11.51	8 320	35 34 0	9.8	33	51	51	0	0
Full year (2005) DI	Fall 10	6	11.29	1	7	10.9	41	51	51	0	0
Conoral Chamiatry 2005 MC	Spring 11	35.5	11.5	8	33.3	10.2	59	51	46	-5	-295
General Chemistry, 2005 MC	Fall 2012	35.4 5	11.51	900	30.5	10.33	45	51	35	-16	-720

General Chemistry, 1999 MC	Spring	40.1	40.00	000	00.0	0.40	40	F 4	20	40	500
Full year (2005) KP	2013	9 35 4	10.03	900 185	36.8	8.12	49	51	39	-12	-588
	Fall 10	5	11.51	8	8	10.28	41	51	42	-9	-369
General Chemistry I 2009 (rev. 2011)		37.1	-	382	Ē			-		-	
CC	F2012	3	11.39	7	36	7.75	17	50	48	-2	-34
General Chemistry I 2009 (rev. 2011)	00040	37.1	44.00	382	33.9	0	00	50	40	0	004
	52013	3	11.39	1	2	9	83	50	42	-8	-664
							176				
					Total S	Students	2		Average	-1	0
		D	ra Canar	al Cha	mintm						
	Su 05	21.5	7 2	al Che	21.9	7.0	10	51	51	0	0
Toledo (1998) DL Toledo (1998) DI	Su 05	31.5	7.2		32.5	8.2	16	51	54	0 3	48
Toledo (1998) DL	Su 08	31.5	7.2		35.2	9.4	21	51	70	19	399
Toledo (1998) DL	Su 09	31.5	7.2		34.6	8.1	13	51	67	16	208
Toledo (1998) RF	F08	31.5	7.2		30.3	7.8	21	51	44	-7	-147
Toledo (1998) DL	F09	31.5	7.2		30.6	6	63	51	47	-4	-252
Toledo (1998) RF	F10	31.5	7.2		32	9.1	50	51	54	3	150
Toledo (1998) DL	Su10	31.5	7.2		32.7	6.4	28	51	58	7	196
					Total S	Students	230		Average	5	0
			Organic	Chemi	strv						
Organic 2002 DD		43.2	organio	<u>enenn</u>	<u>oti y</u>						
5	F 04	8	11.83		34.2	7.7	18	48	23	-25	-450
	• • •	43.2					~-			10	
Organic 2002 DD	S 05	8	11.83	250	36.3	7.3	37	48	29	-19	-703
Organic 2004 DD	F05	39.Z 2	12 16	359	32	8.8	21	50	32	-18	-378
	1.00	39.2	12.10	359	02	0.0	21	00	02	10	0/0
Organic 2004 DD	S06	2	12.16	2	33.1	7.1	41	50	34	-16	-656
	Faa	39.2	40.40	359	05.0	40.0	6.6	50		0	001
Organic 2004 DD	F06	2 39.2	12.16	2 359	35.9	10.8	29	50	41	-9	-261
Organic 2004 DD	Sp07	2	12.16	2	36.8	12.2	42	50	45	-5	-210

		~~~~		~ - ~							
Organic 2004 DD	F07	39.2 2	12.16	359 2	36.7	10.3	21	50	45	-5	-105
		39.2		359							
Organic 2004 DD	Sp08	2 39.2	12.16	2 359	34.7	10.8	38	50	39	-11	-418
Organic 2004 DD	F08	2	12.16	2	35.5	6.9	32	50	41	-9	-288
Organic 2004 DD	Sp00	39.2	12.16	359	20.2	10.1	20	50	10	2	56
Organic 2004 DD	5009	39.2	12.10	2 359	30.2	10.1	20	50	40	-2	-50
Organic 2004 DD	F09	2	12.16	2	34.8	11.8	18	50	39	-11	-198
Organic 2004 DD	Sp10	39.2 2	12.16	359	37.4	10.2	35	50	46	-4	-140
		43.2									
Organic 2002 DD	F12	8 39.2	11.83	359	34.3	9	12	51.3	24	-27.3	-327.6
Organic 2004 DD	Sp12	2	12.16	2	41.1	11.2	38	50	55	5	190
	spring	00	10.10	359	37.4		10	50	40.5	0.5	1.10
Organic Chemistry OR04 MD	2013	39	12.16	2	8		40	50	46.5	-3.5	-140
										Ŭ	Ŭ
		07.0									
Organic 1st 2006 DD	F06	37.8	9.81		33.8	9.2	48	50	37	-13	-624
		37.8									
Organic 1st 2006 DD	Sp07	3 37 8	9.81		31.6	6.5	24	50	28	-22	-528
Organic 1st 2006 DD	F07	3	9.81		33.4	9	54	50	35	-15	-810
Organic 1st 2006 DD	Sp08	37.8 3	0.81		29.6	7.2	35	50	22	-28	-080
	0000	37.8	3.01		23.0	1.2	55	50	22	-20	-300
Organic 1st 2006 DD	F08	3	9.81	150	36.3	7.9	50	50	46	-4	-200
Organic 1st 2006 DD	F09	37.0	9.81	0	37.7	8.9	58	51	51	0	0
	• • •	37.8		156							
Organic 1st 2006 DD	Sp10	3 37 8	9.81	0 156	32.6	8	29	51.3	31.8	-19.5	-565.5
Organic 1st 2006 DD	F10	3	9.81	0	35.6	9.9	47	51.3	43.4	-7.9	-371.3
Organia (at 2000 D)/	0-10	37.8	0.04	156	25.0	10.4	00	<b>F4 0</b>	40	0.0	000.4
Organic 1st 2006 PV	5p12	3	9.81	156	35.2 26.2	10.4	28	51.3	43 51	-8.3	-232.4
Organic TSt 2000 DD	FII	51.0	9.01	100	30.5	9.0	50	51.5	51	-0.3	-17.4

1st Term Org Chem (OR06F) DD 1st Term Org Chem (OR06F) DD	spring 2013 fall 2012	3 37.8 3 37.8 3	9.81 9.81	0 156 0 156 0	39 38.2	8.19 10.7	34 65	51.3 51.3	55 53	3.7 1.7	125.8 110.5
					Total S	tudents	980		Average	-10	-8

## American Chemical Society Standardized Final Examination Data Academic Year 2004-present

								Pe	rcentile	Percentil	Differenc
ACS Final	Semester		Ra	w Scor	e Averag	ge		Av	/erage	е	е
			Std.		CSU	Std.					
(Exam name & year)	Given	U.S.	Dev.	N =	-P	Dev.	N =	U.S.	CSU-P	Raw	Weighted
			Bioch	nemisti	·у						
Biochemistry 2003 SB	Spring 04	35.4	9.3		29	5.7	4	50	26	-24	-96
Biochemistry 2003 SB	Spring 05	35.4	9.3		26	5.8	3	50	17	-33	-99
Biochemistry 2003 SB	Spring 06	35.4	9.3		31	1	3	50	34	-16	-48
Biochemistry 2007 SB	Spring 07	32.9	8.9		24	2.7	3	53	18	-35	-105
Biochemistry 2007 SB	Spring 09	32.9	8.9		30	4.1	7	53	39	-14	-98
Biochemistry 2007 SB	Spring 10	32.9	8.9	839	38.5	4.5	4	53	72	19	76
Biochemistry 2013 SB	1 0	24.5									
	Spring 12	3	6.41		29.1	1.24	4	NA	NA		
Biochemistry 2007 SB	Spring 13-										
	UG	32.9	8.9	839	28.7	4.4	3	53	36	-17	-51
Biochemistry 2007 SB	Spring 13-									_	
	G	32.9	8.9	839	36.8	7	5	53	62	9	45
					Total S	Students	36		Average	-14	-10
			Physical	Chem	istry						
P-Chem Comp. (1995) RS	Fall 04	31.3	9.2	442	35.0		1	53	67	14	14

P-Chem Comp. (1995) RS	Spring 05	31.3	9.2	442	30.3	5.1	3	53	50	-3	-9
P-Chem Comp. (1995) RS	05/Sp06	31.3	9.2	442	38	7.8	4	53	75	22	88
P-Chem Quant. (1995) RS	Spring 05	21.6	5.8		18.7	6.2	10	53	34	-19	-190
P-Chem Quant. (1995) RS	Spring 06	21.6	5.8		19.4	7.9	7	53	40	-13	-91
P-Chem Quant. (1995) RF	Fall 08	21.6	5.8		24.8	7.4	17	53	63	10	170
P-Chem Quant. (1995) RF	Fall 09	21.6	5.8		24.9	6.9	13	53	64	11	143
P-Chem Quant. (1995) RF	Fall 10	21.6	5.8		25.6	4.2	8	53	69	16	128
P-Chem Quant. (1995) RF	Fall 12	21.6	5.8		28.9	6.1	10	53	63	10	100
P-Chem Thermo. (1996) RS	Fall 04	21.3	7.1		20.6	4.3	8	53	51	-2	-16
P-Chem Thermo. (1996) RS	Fall 05	21.3	7.1		18.4	5.4	12	53	40	-13	-156
P-Chem Thermo. (2006) RF	Spring 09	26.4	7.0		26.4	7.2	19	51	51	0	0
P-Chem Thermo. (2006) RF	Spring 10	26.4	7.0		28.2	8.8	18	51	56	5	90
P-Chem Thermo. (2006) RF	Spring 13	26.4	7.0		29.3	6.4	11	53	61.8	8.8	96.8
					Total St	tudents	141		Average	-4	3
		h	norganio	: Chem	istrv						
1991 Inorganic LW	Spring 05	23.9	8	419	27.8	6.6	4	54	69	15	60
Inorganic (2002) CC	Spring 12	28.4	8.1		31	0	2	52	66	14	28
Ç ( ,	1 0										
					Total St	tudents	6		Average	14.5	14.66667
		A	nalytica	I Chem	nistry						
Analytical Chemistry 1994 DC	Fall 04	19.5	6.3	233	18.8	5.3	12	54	51	-3	-36
Analytical Chemistry 1994 DC	Fall 05	19.5 19.4	6.3	233	17.9 18.7	4.5	18	54	45	-9	-162
Analytical Chemistry 1994 CK	Fall 08	7	3.37	233	6	4.62	18	51	51	0	0

Analytical Chemistry 2007 CK Analytical Chemistry 2007 KP	Fall 10 Fall 10	27.5 27.5	7.1 7.1	707 707	28.8 33.5	6.7 5.6	16 6	52 52	59 81	7 29	112 174
Analytical Chemistry 1994 CK	Fall 11	19.4 7 27.5	3.37	233	25.9	5	9	51	88	37	333
Analytical Chemistry 2007 CC	F2012	27.0	7.08	707	28	7.36	10	50	55	5	50
					Total S	tudents	89		Average	9	5
		In	strumen	tal Ana	alysis						
Instrumental Analysis 2001 DL	Spring 05	32.8	7.8	237	29.8	6	6	47	37	-10	-60
Instrumental Analysis 2001 DL	Spring 06	32.8	7.8	237	29	11.8	13	47	36	-11	-143
Instrumental Analysis 2001 CK	Spring 07	32.8	7.8	237	30.7	8.2	11	47	38	-9	-99
Instrumental Analysis 2001 CK	Spring 09	32.8	7.8	237	29.2	7.8	15	47	36	-11	-165
Instrumental Analysis 2001 CK	Spring 10	32.8	7.8	237	34.3	7.7	12	47	56	9	108
Instrumental Analysis 2009 DL	Spring 11	24.1	6.6		28.7	8.5	10	51	78	27	270
Instrumental Analysis 2009 DL	Spring 13	24.1 24.1	6.6		29.8 26.1	5.2	8	51	82	31	248
Instrumental Analysis 2009 KP	Spring 12	2	6.6		4	6.87	7	51	59.1	8.1	56.7
					Total S	tudents	82		Average	4	3