Academic Program Assessment Report for AY 2017-2018

Program:___Chemistry________________

(Due: June 1, 2018)

Date report completed: ____05/12/18_______

Completed by:_Chad Kinney______________________________

Assessment contributors (other faculty involved): __Data Provided by and Report Reviewed by Department Faculty________

Please describe the 2017-2018 assessment activities and follow-up for your program below. Please complete this form for each undergraduate major, minor, certificate, and graduate program (e.g., B.A., B.S., M.S.) in your department. Please copy any addenda (e.g., rubrics) and paste them in this document, save and submit it to both the Dean of your college/school and to the Assistant Provost as an email attachment before June 1, 2018. You'll also find this form on the assessment website at https://www.csupueblo.edu/assessment-and-student-learning/resources.html. Thank you.

I. Assessment of Student Learning Outcomes (SLOs) in this cycle. Including processes, results, and recommendations for improved student learning. Use Column H to describe improvements planned for 2018-2019 based on the assessment process.

A. Which of the program SLOs were assessed during this cycle? **Please include the outcome(s) verbatim from the assessment plan.**	B. When was this SLO last assessed? (semester and year)	C. What method was used for assessing the SLO? **Please include a copy of any rubrics used in the assessment process.**	D. Who was assessed? Please fully describe the student group(s) and the number of students or artifacts involved.	E. What is the expected achievement level and how many or what proportion of students should be at that level?	F. What were the results of the assessment? Include the proportion of students meeting proficiency.	G. What were the department's conclusions about student performance?	H. What changes/improvements to the program are planned based on this assessment?
Students will exhibit a comprehensive knowledge of the fundamental theories and concepts necessary in the chemical sciences.	Data are collected at the end of every semester and assessed annually. The SLO was last assessed in Spring	The ACS Exams Institute provides standardized exams that cover all the major sub-disciplines within chemistry. The chemistry program uses these exams where appropriate (general, organic, physical, analytical,	All students taking core chemistry courses will take the ACS exams (360 ACS exam scores were reported during the 17-18 AY. This is does not represent 360 unique students	Faculty expect that students on average will score at or bove the 50th percentile on both the ACS and MFAT standardized exams. However it is	Student results on ACS exams, where comparison to national data is available, was frequently abovethe 50th percentile for course averages. This is true of most upper division course that are primarily made up of Chemistry Majors. In most cases where the class average percentile is below the 50th percentile the class average was close to the 50th	Based on the expected knowledge of chemistry established by the American Chemical Society as well as tested by the MFAT exam, stundents at CSU-Pueblo are generally performing at or above the national average among their peers at other	Historically areas for improvement in SLO performance has been with students in early chemistry courses, especially General Chemistry. This was acknowledged in the recent grant application to the U.S. Dept. of Educatin grant that was awarded and supports the CBASE Program. The research program of the CBASE Program is curricular development and piloting of smaller studio style general chemistry coruses, which will began

	2018.	inorganic, and biochemistry). The Major Field Achievement Test (MFAT) is also required of all graduating seniors and is used to assess student knowledge in chemistry.	since many students take multiple chemistry courses, and therefore, take multiple exams in an given AY). Six students completed the MFAT exams during the 17-18 AY.	normal for courses, especially trailer sections of general chemistry and organic chemistry to be lower.	percentile. (i.e. 40th percentile and up). The one exception to this was one of the spring CHEM 301 sections offered this AY. Frequently we observe that trailer sections fall below the 50th percentile on the ACS exam used to assess students. We do see that class performance on ACS Exams designed for a given course can vary depending on the exact exam form utilized (e.g. results for CHEM 122) The MFAT exam scores again demonstrate favorable performance among senior students with the average scores in all chemistry sub-disciplines tested being well above the 50th percentile and the overall combined average on the exams in the 64th percentile. Furthermore, 2 of the 6 students tested at the 98th percentile or greater overall. 4 of the 6 students tested at the 50th percentile or greater overall. Summary of current AY and historic ACS and MFAT exam results are included with this assessment report.	institutions of higher education. Exceptions to this are generally limited trailer sections for those courses that have them. The majority of students completing a degree in chemistry at CSU-Pueblo demonstrate an knowledge of chemistry that exceeds that of most student completing a chemistry degree at other institutions using the MFAT exam as an assessment tool.	F2017. Additional efforts to increase actively learning strategies have been incorporated into traditional sections of these coruses. Intial data based on DWF rates is very promising. Hopefully, better student outcomes at the general chemistry level will lead to improved student outcomes in later courses. If successful, the future of studio style courses will be dependent upon adequate institutional support. Without additional resources, these approaches are not feasible in the current and likely future fiscal climates on campus. If successful, these approach could be considered for adaptation to other chemistry courses. Other, simultaneously researched efforts to test the use of a flipped classroom approach to general chemistry, which may be more sustainable for larger class sizes began S2018, and looks very promising. Students that successfully complete the first two years of the chemistry curriculum (CHEM 121/L, 122/L, 301/L, and 302/L) largely succeed in the program and perform well on national exams like the MFAT. However, the department continues to witness a large number of underprepared students in the early chemistry curriculum, which historically leads to high attrition. As noted above, it is likely that some of the best ways to address these student difficiencies are approaches which require more resources, such as smaller sections and hands on experiences integrating lecture and lab courses in the early curriculum. Previous grant funding (PROPEL Grant) demonstrated that a smaller class sizes can effectively increase success for students that were previously unsuccessful in a traditional

							large lecture format.
2. Students will exhibit the mathematical and problem-solving skills necessary in the chemical sciences.	Data are collected at the end of every semester and assessed annually. The SLO was last assessed in Spring 2018	The ACS Exams Institute provides standardized exams that cover all the major sub-disciplines within chemistry. The chemistry program uses these exams where appropriate (general, organic, physical, analytical, inorganic, and biochemistry). The Major Field Achievement Test (MFAT) is also required of all graduating seniors and is used to assess student knowledge in chemistry.	All students taking core chemistry courses will take the ACS exams (360 ACS exam scores were reported during the 17-18 AY. This is does not represent 360 unique students since many students take multiple chemistry courses, and therefore, take multiple exams in an given AY). Six students completed the MFAT exams during the 17-18 AY.	Faculty expect that students on average will score at or bove the 50th percentile on both the ACS and MFAT standardized exams. However it is normal for courses, especially trailer sections of general chemistry and organic chemistry to be lower.	Student results on ACS exams, where comparison to national data is available, was frequently abovethe 50th percentile for course averages. This is true of most upper division course that are primarily made up of Chemistry Majors. In most cases where the class average percentile is below the 50th percentile the class average was close to the 50th percentile. (i.e. 40th percentile and up). The one exception to this was one of the spring CHEM 301 sections offered this AY. Frequently we observe that trailer sections fall below the 50th percentile on the ACS exam used to assess students. We do see that class performance on ACS Exams designed for a given course can vary depending on the exact exam form utilized (e.g. results for CHEM 122) The MFAT exam scores again demonstrate favorable performance among senior students with the average scores in all chemistry sub-disciplines tested being well above the 50th percentile and the overall combined average on the exams in the 64th percentile. Furthermore,	Based on the expected knowledge of chemistry established by the American Chemical Society as well as tested by the MFAT exam, students at CSU-Pueblo are generally performing at or above the national average among their peers at other institutions of higher education. Exceptions to this are generally limited trailer sections for those courses that have them. The majority of students completing a degree in chemistry at CSU-Pueblo demonstrate an knowledge of chemistry that exceeds that of most student completing a chemistry degree at other institutions using the MFAT exam as an assessment tool.	Similar conclusions as SLO 1 stated above.

					2 of the 6 students tested at the 98th percentile or greater overall. 4 of the 6 students tested at the 50th percentile or greater overall. Summary of current AY and historic ACS and MFAT exam results are included with this assessment report.		
3. Students will be able to research, review and understand the current chemical literature and be able to critically evaluate, write about and professionally present such material.	Data are collected at the end of every semester and assessed annually. The SLO was last assessed in Spring 2018	Although aspects of Learning Outcome Three are incorporated into much of the curriculum, assessment of the third learning outcome takes place during the required senior seminar course, Chem 493 and in other higher level courses. All faculty are expected to attend the student's senior seminar and an evaluation tool is distributed to every member present. Evaluation tool included.	Devlopment of the skills required for this SLO occur throughout the curriculum. However, final assessment occurs as part of the CHEM 493-Senior Seminar Course (8 students 17-18 AY).	Faculty evaluations of the senior seminar are pooled and included in the student's grade for the course which is compiled by the instructor of record. Evaluations are given on a 100-point scale and faculty expect students to achieve an average of 70 or better for satisfactory performance.	6 of the 8 students assessed through the CHEM 493 course were at the 70% mark or better. Of the two student who did not meet this expectation one withdrew from the course and the other received an "IN".	Generally speaking students have developed the needed skills throughout the chemistry curriculum to meet this SLO. This is demonstrated by performance at or above the expected level of achievement in CHEM 493 as assessed by the department faculty as a whole.	Given the performance in meeting this SLO the aspects of the chemistry curriculum designed to meet it appear appropriate at this time. No changes are deamed necessary at this time.

Comments on part I:

II. Closing the Loop. Describe at least one data-informed change to your curriculum during the 2017-2018 cycle. These are those 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 to generate the data which informed the change? Please indicate the semester and year.	C. What were the recommendations for change from the previous assessment?	D. How were the recommendations for change acted upon?	E. What were the results of the changes? If the changes were not effective, what are the next steps or the new recommendations?
SLO 1 and 2	Data are collected at the end of every semester. The SLO was last assessed in Spring 2018.	Given the consistently elevated DWF rate in general chemistry courses the proposed change will be to assess student success in courses offered in a revised format/ delivery tools. This has included integrated lecture and lab courses in a studio format with a reduced number of students and larger lecture formats with a weekly flipped classroom component and use of engagement through the use of clickers. Previous success with smaller sections of general chemistry courses using the SAFE Course approach was limited to summer offerings. Beginning this past fall represent the first attempt at assessing smaller sections and the use of a studio format in the Chemistry Department during the regular academic year. The studio approach was proposed as part of the assessment process 2 years ago, but funding was not available to support a pilot until the current academic year through the CBASE grant program. The flipped classroom approach has also been supported through CBASE.	Given that the studio approach to General Chemistry requires additional time and effort on the part of the instructor as well as necessitated small class size since the course will have to be offered in a lab setting, grant funding was required to test this approach. One of the two external grant applications proposing the studio approach were submitted, and fortunately one was funded through the U.S. Dept of Education. In addition to the grant funded education research, a simultaneous research project involving a flipped classroom approach to general chemistry will be initiated next AY.	Initial results are promising for both the studio approach as well as the flipped classroom approach. Historically DWF rates in general chemistry have hovered around 50%. Much of this can be attributed to poor preparation of students enrolled in these courses usually a lack of adequate math skills upon entering the Univresity. Both the smaller setting of the studio setting as well as a flipped approach allows for greater interaction with factuly and peers and greater practice of problems/concepts necessary for success in general chemistry. The pass rate (C or better) for students in CHEM 121 in the studio format in F17 was 77%. Students completing CHEM 121 that incorporated a flipped classroom component had a pass rate (C or better) of 70%, which is very good especially for a trailer section of CHEM121. Both formats represent a dramatic increase in pass rate over historical averages. However, this does represent a limited data set, but fortunately the grant support to gather additional data is in place for the next several years. CHEM 122 taught in the spring was not as successful with a 40% pass rate, but this was for an extremely small number of students (n = 10). This points to the need for additional data to truly understand the success of differing pedagogies as it pertains to student success.

Comments on part II:

Seminar Score ________

Abstract (%) ________

100 point scale

Seminar Assessment & Comments

CHEM 493

Student Presenter ________________________________

Topic ____ **Date** ______________________________________

The objective of the 50 minute talk is to illustrate the student's ability to coherently present information of a specific nature.

Topic: (10 pts) ______________

Appropriateness of topic: *narrow enough* to include specific material while having *breadth of interest*? Is it sufficiently *chemical in nature*? Is it of *general interest*? Is it timely?

Content: (35 pts) ______________

Is there *sufficient chemistry* in the presentation? Is the material presented *relevant to the topic*, correct, well-documented and current? Is it *clearly* and *logically* presented?

Organization: (20 pts) ______________

Does the *introduction* provide a *good overview*? Does each *topic flow naturally* form the previous one? Does the presentation *"tell a story"*? Is the *material appropriate* for the intended audience?

Presentation: (20 pts) ______________

Does the presenter maintain *good eye contact*, and use *appropriate strength of voice*, while *engaging listeners*?

(40 min) Start time_________ Stop time _______________

Graphics, Diagrams, Figures: (10 pts) ______________

Do the visual aids *supplement the presentation* or are they superfluous? Do visual aids fit *logically* into presentation? Are they *discussed in detail*? Are they *easy to read and follow*?

Use of Power Point: (5 pts) ______________

How well was the *visual presentation* put together? (general *appearance, clarity, and legibility of slides; effective* use of Power Point).

General Impressions:

American Chemical Society Standardized Final Examination Data
Year 2004- present

Academic

ACS Final	Semester	Raw Score Average						Percentile Average		Percentile	Difference
(Exam name & year)	Given	U.S.	Std. Dev.	N =	CSU-P	Std. Dev.	N =	U.S.	CSU-P	Raw	Weighted
General Chemistry Exams											
1st Term (CHEM 121)											
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	Fall 05	39	11	2000	39	12	63	51	48	-3	-189
1st term (1997)LW	Fall 06	39	11	2000	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	Fall 08	40	12	4524	38	10	56	48	45	-3	-168
1st term (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 2010	40.35	12.26	4524	32.05	10.91	65	50	28	-22	-1430
1st term (2009) KP	Spring 2010	37.1	11.4	3827	38.2	11.6	74	51	54	3	222
1st term (2009) RF	F10	37.1	11.4	3827	38.2	12.2	33	51	54	3	99
1st term (2005) DL	Su 10	40.35	12.26	4524	45.08	11.09	22	50	63	13	286
1st term (2009) DD	Su 11	37.13	11.39	3827	36.8	10.3	26	51	50	-1	-26
1st term (2009) CC	F11	37.13	11.39	3827	33.9	11.2	78	51	41.8	-9.2	-717.6
1st term (2009) CC	Sp12	37.13	11.39	3827	34.3	10.7	90	51	42.9	-8.1	-729
1st term (2009) RF	F12	37.13	11.39	3827	37.1	9.1	71	51	50.5	-0.5	-35.5
2nd term (2009) CC	Sp 14	37.13	11.39	3827	34.3	9.4	73	51	43.2	-7.8	-569.4
General Chemistry I 2009 (rev. 2011) CC	F2012	37.13	11.39	3827	36	7.75	17	50	48	-2	-34
General Chemistry I 2009 (rev. 2011)	S2013	37.13	11.39	3827	33.92	9	83	50	42	-8	-664
Gen. Chem. First Term 2009	Fall 2013	37.13	11.39	3827	34.7	9.7	81	51	43.4	-7.6	-615.6
1st term (2009) CC	Sp 14	37.13	11.39	3827	34.3	9.4	73	51	43.2	-7.8	-569.4
1st Term Form 2009 Rev 2011 CC	Fall 2014	37.13	11.39	3827	38.54	12.06	34	51.3	56	4.7	159.8

First Term General Chemistry KP	F2014	40.35	12.26	4524	44.08	10.91	26	50	61	11	286
1st term (2009) KP	Sp 2015	37.13	11.39	3827	34.1	12.2	61	51.3	42	-9.3	-567.3
First Term Form 2009 (CC)	Fall 2015	37.13	11.39	3827	36.78	10.95	74	51.39	50.31	-1.08	-79.92
First Term Form 2005 (CC)	Spring 2016	40.35	12.26	4524	36.69	11.08	64	50.70	41.07	-9.63	-616.32
First Term Form 2009 (KP)	Fall 2016	37.13	11.39	3827	31.69	11.19	35	51	37	-14	-490
First Term Form 2009 (KP)	Spring 2017	37.13	11.39	3827	35.07	10.57	72	51	45	-6	-432
First Term Form 2005 (CC)	Fall 16	40.35	12.26	4524	38.9	11.56	49	50.7	47.7	-3	-147
1st term GC2005 (MC)	F17	40.35	12.26		38.86	9.84	14	50	46.7	-3.3	-46.2
1st term GC2018 trial test (MC)	F17	n.d.	n.d.	n.d.	39	8.7	14	n.d.	48		
2005 Gen Chem 1st Term (RF)	F17	40.35	12.26		46	11.3	18	51	62.8	11.8	212.4
Gen Chem First Term (KP)	Spring 2018	37.13	11.39	3827	33.14	8.80	28	51	40	-11	-308
				Full Year (CHEM 122)							
Full year (1999) LW	Spring 05	40.19	10.03	955	37.5	9.5	48	51	41	-10	-480
Full year (1999) RS	Fall 04	40.19	10.03	955	42	12.7	33	51	59	8	264
Full year concept (2001) LW	Spring 05	33.1	11		31.9	9.9	49	53	48.5	-4.5	-220.5
Full year (1999) DD	Su 05	40.19	10.03	955	34.6	7.6	22	51	35	-16	-352
Full year (1999) RS	Fall 05	40.19	10.03	955	43.4	10.8	34	51	62	11	374
Full year (1999) LW	Spring 06	40.19	10.03	955	37	11	41	51	39	-12	-492
Full year concept (2001) LW	Spring 06	33	10		33	11	39	53	53	0	0
Full year (1999) DD	Su 06	40.19	10.03	955	42.4	9.1	20	51	60	9	180
Full year (2005)LW	Sp 07	35.5	11.5	1858	32.2	9.5	47	52	43	-9	-423
Full year concept (2001) LW	Sp 07	31.2	9.99		32.2	9.5	48	52	56	4	192
Full year (2005)LW	Su 07	35.5	11.5	1858	37.7	12.6	11	52	61	9	99
Full year (2005)LW	Sp 08	35.5	11.5	1858	34	11	27	51	48	-3	-81
Full year concept (2001) LW	Sp 08	31.2	9.99		35	11	26	53	60	7	182
Full year (2005)LW	Sp 09	35.5	11.5	1858	36	11	31	51	54	3	93
Full year concept (2001) LW	Sp 09	31.2	9.99		34	14	31	53	56	3	93
Full year (2005) DL	Su 08	35.5	11.5	1858	33	9.7	21	51	42	-9	-189
Full year (2005) DL	Fall 08	35.5	11.5	1858	34.1	16.4	23	51	48	-3	-69
Full year (2005) CK	Su 09	35.45	11.51	1858	36.85	14.09	20	51	58	7	140
Full year (2005) DD	Su10	35.45	11.51	1858	35	9.8	33	51	51	0	0
Full year (2005) KP	Fall 10	34.76	11.29	3201	34.07	10.9	41	51	51	0	0
Full year (2005) DL	Spring 11	35.5	11.5	1858	33.3	10.2	59	51	46	-5	-295

General Chemistry, 2005 MC	Fall 2012	35.45	11.51	900	30.5	10.33	45	51	35	-16	-720
General Chemistry, 1999 MC	Spring 2013	40.19	10.03	900	36.8	8.12	49	51	39	-12	-588
Full year (2005) KP	Fall 10	35.45	11.51	1858	31.88	10.28	41	51	42	-9	-369
Gen. Chem. 2005 MC	F2013	34.45	11.51		31	8.66	39	54	40	-14	-546
Gen. Chem. Conceptual 2001 MC	Sp2014	31.25	9.99		32.7	8.6	41	51	56	5	205
Gen. Chem. 2005 MC	Sp2014	34.45	11.51		30.5	9.7	41	54	41	-13	-533
Gen. Chem. 1999 MC	Fall 2014	40.19	10.03		32.65	8.55	42	51	30.4	-20.6	-865.2
Gen. Chem. 2001 (Concept) MC	Fall 2014	31.25	9.99		42	17.6	41	51	44	-7	-287
Gen. Chem. 2005 MC	Spring 2015	34.45	11.51		35.97	10.18	35	48	51.2	3.2	112
Gen. Chem. 2001 (Concept) MC	Spring 2015	31.25	10.0		34	7.3	34	51	60	9	306
Gen Chem 1999 (MC)	Summer 2015	40.19	10.03		36.75	8.24	11	51	39	-12	-132
Gen Chem 2005 (MC)	F2015	34.45	11.5		37.92	11.32	35	48	61	13	455
Gen Chem 2001 (concept) (MC)	F2015	31.25	9.99		34	9.2	36	51	61	10	360
Gen Chem 2015 (MC)	Sp2016	41.44	9.38	166	40	8.36	36				
Gen Chem 2017 (MC)	Sp2016				36	7.8	33				
General Chemistry 2015 (prelim norms) MC	F16	41.44	9.4	166	52	13.3	33		46.4		
General Chemistry 2001 (Conceptual) MC	F16	31.25	10.0		52.9	15.4	33		48		
General Chemistry 2015 (prelim norms)	Sp17	41.44	9.38	166	57.4	19.2	42		59.1		
Full Year 2015 (JV)	Fall 2017	39.8	10.7	1080	40.69	3.26	39	49	51.9	2.9	113.1
Full Year 2005 (JV)	Fall 2017	35.45	11.51		30.64	6.87	39	53	37.6	-15.4	-600.6
Full Year 2015 (JV)	Spring 2018	39.8	10.7	1080	41.5	9.36	29	49	54	5	145
Full Year 2019 Trial (JV)	Spring 2018	N/A	N/A	N/A	40	8.3	29	N/A	N/A		
Full year GC2019 trial test	Sp18	n.d.	n.d.	n.d.	36.1	11.8	9	n.d.	43		
Full year GC2015 (Prelim norms)	Sp18	38.3	10.6	431	41	11.8	7	n.d.	53		
						Total Students	3162		Average	-2	0
					Pre-General Chemistry						
Toledo (1998) DL	Su 05	31.5	7.2		31.8	7.2	18	51	51	0	0

Toledo (1998) DL	Su 07	31.5	7.2		32.5	8.2	16	51	54	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 Students	230		Average	5	0

Organic Chemistry
CHEM 302

Organic 2002 DD	F 04	43.28	11.83		34.2	7.7	18	48	23	-25	-450
Organic 2002 DD	S 05	43.28	11.83		36.3	7.3	37	48	29	-19	-703
Organic 2004 DD	F05	39.22	12.16	3592	32	8.8	21	50	32	-18	-378
Organic 2004 DD	S06	39.22	12.16	3592	33.1	7.1	41	50	34	-16	-656
Organic 2004 DD	F06	39.22	12.16	3592	35.9	10.8	29	50	41	-9	-261
Organic 2004 DD	Sp07	39.22	12.16	3592	36.8	12.2	42	50	45	-5	-210
Organic 2004 DD	F07	39.22	12.16	3592	36.7	10.3	21	50	45	-5	-105
Organic 2004 DD	Sp08	39.22	12.16	3592	34.7	10.8	38	50	39	-11	-418
Organic 2004 DD	F08	39.22	12.16	3592	35.5	6.9	32	50	41	-9	-288
Organic 2004 DD	Sp09	39.22	12.16	3592	38.2	10.1	28	50	48	-2	-56
Organic 2004 DD	F09	39.22	12.16	3592	34.8	11.8	18	50	39	-11	-198
Organic 2004 DD	Sp10	39.22	12.16	3592	37.4	10.2	35	50	46	-4	-140
Organic 2002 DD	F12	43.28	11.83		34.3	9	12	51.3	24	-27.3	-327.6
Organic 2004 DD	Sp12	39.22	12.16	3592	41.1	11.2	38	50	55	5	190
Organic Chemistry OR04 MD	spring 2013	39	12.16	3592	37.48		40	50	46.5	-3.5	-140
Organic Chemistry 2004 DD	Spring 2014	39.22	12.16		40.1	12	43	51	52.3	1.3	55.9
Organic Chem 2004 MD	F14	39.22	12.16	3592			8	51	25	-26	-208
Organic 2004 DD	Spring 2015	39.22	12.66	3592	38.2	12.8	39	50	47.7	-2.3	-89.7
Organic 2004 (MD)	Spring 2016	39.22	12.66	3592	32	9	19	50	32	-18	-342
ORG 2004 (DD)	fall 2015	39.22	12.66	3593	33.25	11.36	12	50	34.8	-15.2	-182.4
ORG 2004 (DD)	summer 2015	39.22	12.66	3593	33.56	7.02	10	50	35.7	-14.3	-143

ACS Final (Exam name & year)	Semester Given	Raw Score Average U.S.	Std. Dev.	N =	CSU- P	Std. Dev.	N =	Percentile Average U.S.	CSU-P	Percentile Raw	Difference Weighted
ORG 2004 (MD)	Spring 2017	39.22	12.66	3593	41	10	12	50	55	5	60
ORG 2004 (DD)	Fall 2016	39.22	12.66	3593	36.1	13.24	24	50	42.3	-7.7	-184.8
ORG 2004 (MD)	Fall 17	39	12.16	3592	44.4	20.7	14	50	65	15	210
ORG 2004 (MD)	Spring 2018	39	12.16	3592	39.5	10.4	14	50	51.5	1.5	21
				CHEM 301							
Organic 1st 2006 DD	F06	37.83	9.81		33.8	9.2	48	50	37	-13	-624
Organic 1st 2006 DD	Sp07	37.83	9.81		31.6	6.5	24	50	28	-22	-528
Organic 1st 2006 DD	F07	37.83	9.81		33.4	9	54	50	35	-15	-810
Organic 1st 2006 DD	Sp08	37.83	9.81		29.6	7.2	35	50	22	-28	-980
Organic 1st 2006 DD	F08	37.83	9.81		36.3	7.9	50	50	46	-4	-200
Organic 1st 2006 DD	F09	37.83	9.81	1560	37.7	8.9	58	51	51	0	0
Organic 1st 2006 DD	Sp10	37.83	9.81	1560	32.6	8	29	51.3	31.8	-19.5	-565.5
Organic 1st 2006 DD	F10	37.83	9.81	1560	35.6	9.9	47	51.3	43.4	-7.9	-371.3
Organic 1st 2006 PV	Sp12	37.83	9.81	1560	35.2	10.4	28	51.3	43	-8.3	-232.4
Organic 1st 2006 DD	F11	37.83	9.81	1560	36.3	9.6	58	51.3	51	-0.3	-17.4
1st Term Org Chem (OR06F) DD	spring 2013	37.83	9.81	1560	39	8.19	34	51.3	55	3.7	125.8
1st Term Org Chem (OR06F) DD	fall 2012	37.83	9.81	1560	38.2	10.7	65	51.3	53	1.7	110.5
Organic 1st term 2010 ZL	Sp 14	39.39	11.74		29.3	6.8	23	52.2	21	-31.2	-717.6
Organic 1st term 2010 ZL	Sp 14	39.39	11.74		29.3	6.8	23	52.2	21	-31.2	-717.6
First term organic 2006 DD	Fall 2013	37.83	9.81		37.3	10.3	48	51	49.1	-1.9	-91.2
Organic 1st term 2010 DD	Fall 2014	39.39	11.74	1933	39.8	11.2	48	52	53	1	48
Organic 1st 2006 MD	Spring 2015	37.83	9.81	1560	32		24	51.3	30	-21.3	-511.2
Organic 1st term 2006 (MD)	Fall 2015	37.83	9.81	1560	33	8	35	50	33	-17	-595
ORG 1ST TERM 2010 (DD)	spring 2016	39.39	11.74	1933	34.29	11.75	38	52	38.2	-13.8	-524.4
ORG 1ST TERM 2010 (DD)	spring 2017	39.39	11.74	1933	37.8	22.69	45	52	47.4	-4.6	-207
Adv Organaic **401/501** 2004 (MD)	Fall 2016	39.22	12.66	3593	60	4	3	50	94	44	132
Organic Chemistry, 1st term, 2010 (CC)	Spring 2018	39.39	11.74	1933	31.1	9.16	40	50	26.3	-23.7	-948
						Total Students	1502		Average	-9	-9

				Biochemistry (CHEM 412)							
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	Spring 12	24.53	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
Biochemistry 2012 SB	Spring 2014	32.9	8.9	839	34.1	8.14	10	53	55.3	2.3	23
Biochemistry 2012 SF	Spring 2016	32.9	8.9	839	30.4	5.04	9	53	50.73	-2.27	-20.43
Biochemistry 2012 SB	Spring 2017	34	8.92		35.8	17.6	10	50	51.7	1.7	17
Biochemistry 2012 SB	Spring 2018	33.96	8.92	n/a	31	7.1	11	33.5	38.5	5	55
						Total Students	76		Average	-9	-4
				Physical Chemistry							
P-Chem Comp. (1995) RS	Fall 04	31.3	9.2	442	35.0		1	53	67	14	14
P-Chem Comp. (1995) RS	Fall 04	31.3	9.2	442				53		-53	0
P-Chem Thermo. (1996) RS	Fall 04	21.3	7.1					53		-53	0
				CHEM 322							
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
2006 P Chem (Quantum)	F13	29.2	7.8		29.3	6.1	12	51	49.7	-1.3	-15.6
Quantum Mechanics 2006 (RF)	Fall 2015	29.19	7.8	n/a	29.9	5.7	14	51	53.5	2.5	35

Quantum Mechanics 2006 (RF)	Fall 2016	29.19	7.8		29.1	7.6	10	51	51	0	0
Quantum Mechanics 2013 (JV)	Fall 2017	27.11	7.1	354	27.4	13.1	11	54	39.8	-14.2	-156.2
				CHEM 321							
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
2006 P Chem (Thermo) RF	S14	26.4	7.0		24.1	4.5	16	52	40.7	-11.3	-180.8
2006 P Chem (Thermo)	Spring 2015	26.4	7.0	n/a	26.7	7.6	14	51	51.4	0.4	5.6
Thermodynamics 2013 (RF)	Spring 2016	27.48	6.5	378	30.31	8.74	16				
Thermodynamics 2013 (RF)	Spring 2017	27.6	6.8		31.6	5.9	9	52	71	19	171
Thermodynamics 2013 (RF)	Spring 2018	27.6	6.8		26.9	5.9	10	52	46	-6	-60
					Total Students		218		Average	-4	0

Inorganic Chemistry (CHEM 221)

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
Inorganic 2009 MC	F2013	31.79	8.95	482	20.6	7.98	18	51	11.8	-39.2	-705.6
Inorganic Chem. 2009 MC	Fall 2014	31.79	8.95		26.13	10.13	15	51	37	-14	-210
Inorg. Chem. Foundations 2016 MC	F2015				31.6	5.8	15				
Inorg. Chem. Foundations 2017 MC	Fall 2016	31.8	8395		57.75	26	13		53.5		

Inorganic Chemistry (CHEM 421)

Inorganic 2009 MC	Sp2014	31.79	8.95	482	38	7.5	7	51	69.3	18.3	128.1
Inorganic Chem 2009 MC	Spring 2015	31.79	8.95		39.8	7.5	5	51	77	26	130
Inorganic Chemistry 2009	Sp2016	31.79	8.95	482	41.7	6.7	3	51	87	36	108
						Total Students	82		Average	8	-6

Analytical Chemistry (CHEM 317)

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	6.3	233	17.9	4.5	18	54	45	-9	-162
Analytical Chemistry 1994 CK	Fall 08	19.47	3.37	233	18.76	4.62	18	51	51	0	0
Analytical Chemistry 2007 CK	Fall 10	27.5	7.1	707	28.8	6.7	16	52	59	7	112
Analytical Chemistry 2007 KP	Fall 10	27.5	7.1	707	33.5	5.6	6	52	81	29	174
Analytical Chemistry 1994 CK	Fall 11	19.47	3.37	233	25.9	5	9	51	88	37	333
Analytical Chemistry 2007 CC	F2012	27.52	7.08	707	28	7.36	10	50	55	5	50
Analytical Chemistry 2007 CK	F 2013	27.52	7.08	707	28.11	6.21	19	52	56	4	76
Analytical Chemistry 2007 KP	Fall 2014	27.52	7.08		26.0	7.3	13	52	44	-8	-104
Analytical Chemistry 2007 CK	F 2015	27.52	7.08	707	25.8	6.5	18	52	42	-10	-180
Analytical Chemistry 2014 KP	Fall 2016	26.14	7.14		28.4	9	8	50	65	15	120
Analytical Chemistry 2014 CK	Fall 2017	26.14	7.14		27.0	5.16	14	50	58	8	112
						Total Students	161		Average	6	3

Instrumental Analysis

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	6.6		29.8	5.2	8	51	82	31	248
Instrumental Analysis 2009 KP	Spring 12	24.12	6.6		26.1	6.87	7	51	59	8	57
Instrumental Methods 2009 CK	Spring 14	24.12	6.57		26.4	5.68	18	51	67	16	282
Instrumental Analysis 2009 KP	Spring 15	24.12	6.57		22.3	6.8	12	51	42	-9.5	-114
Instrumental Methods 2009 CK	Spring 16	24.12	6.57		23.0	4.1	21	51	45	-6	-126

Instrumental Analysis 2009 KP	Spring 17	24.12	6.57	29.8	5.81	5	51	82	31	155
Instrumental Methods 2009 CK	Spring 18	24.12	6.57	27.0	3.4	7	51	69	18	126
					Total Students	145		Average	6	4

Institutional Performance MFAT
%tile
score

	# Students		Overall		Physical		Organic		Inorganic		Analytical		National Mean
			current yr	cumulative	current yr	cumulative	current yr	cumulative	current yr	cumulative	current yr	cumulative	
semester	number	Cumulative	%tile	%tile	%tile	%tile	%tile	%tile	%tile	%tile	%tile	%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
AY 13-14	4	139	96	63	98	68	87	50	99	67	98	66	46
AY 14-15	13	152	68	63	58	67	72	52	56	66	56	66	48
AY 15-16	10	162	61	63	65	67	59	52	56	66	60	65	53
AY 16-17	12	174	62	63	67	67	51	52	66	66	64	65	53
AY 17-18	6	180	64	63	64	67	58	53	65	66	60	65	53

*AY11-12 and 12-13 were combined to get a large enough N
*AY12-13 and 13-14 were combined to get a large enough N