

Crafton Hills College - Outcomes Assessment Report

General Education Outcome: Quantitative Reasoning

Assessed: 2021-2022

Learning Outcomes Statement

Students successfully completing a course in this area will be able to interpret quantitative reasoning and perform mathematical operations in an effort to demonstrate quantitative reasoning skills.

Means of Assessment (Measurement Method)

Students were assessed during either the Fall 2021, Spring 2022, or Summer 2022 semesters. Assessments occurred in 288 sections and resulted in a total of 5,763 assessments.

Summary of Evidence

Table 1: Number and Percent of students scoring 3 or Higher on the GEO.

GEO #	General Education Outcome	# 3 or higher	% 3 or higher
7	Students successfully completing a course in this area will be able to interpret quantitative reasoning and perform mathematical operations in an effort to demonstrate quantitative reasoning skills.	4,527	78.55%

List of courses where outcomes were mapped to the GEO (27 Unique Courses).

ACCT-208	CHEM-151	FIRET-504	MATH-110	MATH-252
ACCT-209	CIS-101	GEOG-110	MATH-115	MATH-265
BUSAD-100	CIS-136	KIN/S-116A	MATH-141	PSYCH-120
BUSAD-210	CIS-138	MATH-095	MATH-160	
CHEM-101	COMMST-145	MATH-102	MATH-250	
CHEM-150	ENGL-101	MATH-103	MATH-251	

Use of Results/Proposed Actions – Individual Submissions

1	(1) Facilitate more opportunities for students to practice hypothesis testing and to conduct their own inferential studies. (2) Motivate and support students to retain dedication to their studies as the semester progresses.
2	14 out of 17 students completed all assignments and met the SLO's. They were very productive, disciplined and dedicated to the craft. A majority of them were receptive to the materials and topics and connected the theme of the course to their lives and social structure. They were able to synthesize life of the 1980's and apply those issues to 2022. Only a few of the students began to disapprove of the topics being reflected due to their religion and cultural upbringing and it clashed with their ideologies and folkways. A few wanted alternative assignments so I accommodated them with either another homework assignment or discussion. I am attempting to make research sources available to students to study and make them acknowledge the kinds of sources I want from them, instead of allowing them to find them on their own. I have provided them sources to read and actually use and cite in their essays. Overall, a great summer semester with dedicated students.
3	8 out of 18 students were active. 10 students were no shows after the drop date. This will affect the statistics of the class and not something that we can control as instructors. Targets for SLOs were met for those 8 students who made it to the end of the semester and took the final exam with minimum of 80% per SLO. No show students obviously brought down statistics for this course which the SLO program does not take into account when inputting data. Over 50 percent of Students enrolled in this level of class were not prepared for this level of difficulty. Suspect cheating in prior class before coming into this class or failure on the instructor (HS or CHC) for not teaching all the material necessary to succeed in the next level of mathematics.
4	A very high proportion of my class got A's and B's. In the future, perhaps I should re-evaluate my weights for the categories.
5	All most all students understood the SLO's for this class. I feel I could put the SLO's in multiple tests to reinforce if they are learning those specific SLO's or not.
6	All objectives have been met.
7	Continue as is with 70 % target.
8	Continue current classroom strategies.
9	Continue to offer in class data projects and presentations.
10	Continue to offer this course as an on-ground, in-person course.
11	Continue to work on low stakes, formative, and alternative assessments to help students be successful. Work on student retention.
12	Create some time to work with colleagues in order to share strategies on best teaching practices when teaching hypothesis testing. Continue to create and provide students with supplemental resources for the course.
13	Develop assignments and assessments that increase students' conceptual understanding. Develop more material that engages and includes students in their learning process. Increase

	support to define and address corequisite skills. Intrusive support, reach out to students before it is too late.
14	Do more student explanations at the board, and more questioning to help the student think through the concepts and processes.
15	Do more student explanations at the board, and more questioning to help the student think through the concepts and processes. Concentrate more on correct notation.
16	Evaluate logic statements and compute the context of the particular application.
17	Great start to the class! I thought the results from the first Exam were a bit too good actually and may have overcorrected when we got to probability. Either way probability was a low point for my class here and I believe I just need to redo all of my probability section. I think my lecture is alright in terms of giving the main rules of probability but my students were clearly lacking understanding so I need to focus more on having more involved examples of the rules and why they work. The next section on inference actually had students bounce back a bit which is impressive since it is such a tougher section than probability. By this point I was running short on time and didn't really get to have a chance to make sure that everyone was up to speed. I feel that many of these students would have really prospered with an extra support section. Either way I would like to keep refining this section. I have some great group activities but I feel that I really need to nail the introduction of hypothesis testing a bit better since it is such a foreign process.
18	Had a very small class this summer and a couple of students who were doing poorly ended up dropping before the class ended. But those who were able to stick with the faster pace schedule ended up doing pretty good! The roughest section was solving for trigonometric equations which also includes covering many of the trigonometric identities. I wish we could've spent more time there but we had to move on to the next chapter. It might be worth having an Exam before covering trigonometric equations and spending more time with them and the rest of the material afterwards.
19	Have special tutoring sessions for Hypothesis testing available for students in person at the tutoring center and online through zoom. This always seems to be a struggle conceptually for students. Students also have trouble making a final conclusion at the end and relating back to the initial scenario. What decision comes from the data? I tweak my strategies every semester and will continue to try new ways to teach the material.
20	Having such a small group of students helped them understand the subject a lot more.
21	Homework during the semester will need to have a higher weight towards the overall score, the lack of doing homework affected greatly students, it corresponded with low exam scores.
22	Hybrid class: being able to meet face to face really helped. Just by see the student faces I could tell when just-in-time remediation was necessary, thus using the white boards in the classroom.
23	I am going to work on giving out more handouts and practice worksheets to do in class in groups or individual that must be turned in that day or the following to make sure the students are staying up on the material.
24	I have used Jamboard for online interactive engagement in the class. This tool is nice to see every student typing the answers at the same time; however, it's not perfect website for math students. I will try to use new feature of Mymathlab this upcoming Fall and hope it will give more benefit to students' learning virtually.
25	I let students take the test twice since distance learning is stressful for the students when they are evaluated. Each test question comes from a test bank so each student takes a similar test

	to other students and the second attempt at the test is not exactly like the first attempt at the test. Most students from this eight-week class take the test twice and reinforces the positive action of continuous effort to improve.
26	I plan on doing a better test review and more check ins during the semester to look for competency.
27	I reached out to the non-passing students. I let them take assessments twice. I also let the student who missed a test twice take the test a different day. The students may have not passed the class, but reaching out to them made the students continue their effort and adjust their study skills. Eight-week math classes may be considered extreme to many students and the actions I took during the class was an effort to lower the stress for the students and keep them focused on continued effort.
28	I used the curriculum [name] uses again this semester, and I really am liking it. I think the students are doing well partly because of that curriculum.
29	I was making sure to take time in the class to let them work together in small groups on the concepts we are working on, doing problems similar to the homework and then going over these problems as extra examples. This method during the summer course, greatly helped students understand the material. Especially when we get into the last chapters on probability and statistical concepts.
30	I will continue to investigate different pedagogical methods for teaching set operations and their applications.
31	I will explore different pedagogical strategies for teaching the graphs of polynomial, rational, exponential, and logarithmic functions as well as solving exponential, logarithmic, and algebraic equations.
32	I will have more interactive and in-class exploration when writing proofs and analyzing derivatives.
33	I would like to dedicate more time to SLO 1 in future semesters.
34	I would like to use an assessment system that allows students more flexibility in choosing what to learn.
35	Implement more group work during class. Do a better job explaining importance of homework.
36	In person exams will help to see what the students are really learning. Exams in the online format are difficult to really evaluate the students knowledge as it is difficult to keep them from using notes or online resources. Some students are honest and do not use these resources but others are not. So, FALL 2022 we will have in person exams again and it will be a better indication of what the students know.
37	In the future I plan to incorporate more self graded homework where students have clearly outlined learning objectives.
38	Incorporate more Geographic Information Systems projects during the semester.
39	It was an online class. So, more attention on showing written work on logic problems.
40	Keep having cooperative learning activities. Do more student explanations at the board, and more questioning to help the student think through the concepts and processes.
41	Keep monitoring.
42	Math 095 is no longer going to be offered. No action required.
43	Math department will discuss these results.
44	More low-stakes assignments with feedback to better track students who are struggling before it is too late. Make sure that students are watching lecture videos, not just attempting

	homework and using MML tools to answer questions without retaining or understanding concepts.
45	More support
46	More support of some kind is needed. Many students are extremely deficient in the skills required to successfully complete this course.
47	More training on how to maximize embedded tutor in the classroom. More low stakes assignments to offer feedback and better prepare students for exams. Offering more low stakes quizzes has helped with exam anxiety. Less time lecturing, more time actively learning in the classroom. Need to develop more real world examples that can be used in the course. Intrusive support. Reach out to online students sooner and more frequently.
48	Most students are prepared for 102. Still have to review basic mathematical skills such as radicals (et al) and exponent rules. Note taking skills need to be honed. Covid has not helped the math situation. More lab time is needed.
49	My class was made up of 8 students. This small classroom made it so I was able to give a lot of attention to each student. However, it must be noted that the attendance for this small groups was also good (rarely had any absences).
50	Need more hands on laboratory experience. This should be addressed in FALL 2022 as we return to in person labs
51	Need to spend more time on reviewing the proper sampling techniques with my students. Need to attempt to implement the three SLO objectives throughout all tests, if possible.
52	No further actions needed - Students meet the minimum standard or above in the student learning outcomes. Assessment was a result of student feedback surveys, group discussions, and class projects
53	No proposed actions at this time.
54	None. Math 095 will no longer be taught for the near future.
55	Only 7 students assessed due to low class size. I believe it was successful overall for those I was able to keep in class.
56	Overall, I am happy with these results, but would provide some deeper instruction on Set Operations.
57	Perhaps if we know which SLOs will be assessed for the semester for Math 110, I can spend some more time in class emphasizing and going over those topics to better prepare the students for the final exam. I can also tailor my final exam to make sure the questions I am asking align with the SLOs that are being assessed.
58	Require students to show written solutions for problems like confidence intervals, hypothesis testing, and linear regression.
59	Some kind of measure is needed to determine if the students have a reasonable chance to succeed in the course they enroll in.
60	Spend more time graphing and recognition of functions
61	Spend more time on counting methods
62	Starting the semester online hindered student learning. Make the class face-to-face for the entire semester.
63	Stronger math skills, teach note taking and effective studying, push tutoring center more, teach how to be a student and time management.
64	Student engagement and math skills needs improvement. *this section had 7 students who remained in class but did not participate in lecture, lab or assessment. these students were included in this data.

65	Student focus and math skills need to be addressed and assisted. better ways to encourage and push tutoring is being planned.
66	Student should apply and use the definitions in order to understand.
67	Students are unprepared entering Crafton Hills from high school. Students are lacking basic mathematical skills.
68	Students coming into this class are exceedingly lacking the skills needed to succeed. So much so that a lab alone may not even been enough to help many of them. Some additional support is needed. Just what that may be needs to be a discussion the math department needs to address.
69	Students may need more practice on interpreting descriptive statistics, applying methods of discrete and continuous probabilities to real-world situations, and apply inferential statistical methods such as confidence intervals and hypothesis testing.
70	Students need more math knowledge and understanding before being able to solve problems. Tutoring and STEM center will be a big part of improving this need, as well as workshops and refresher videos.
71	Students need to be stronger in algebra and completed higher in math to success in number 2
72	Students need to solve the problem correctly. It means not just to give a correct answer, but to write correct steps. Students need to learn how to organize their written work. To help them, I would place more examples with written solutions on the Discussion Board. Also, to suggest students to place their own written work as an example for other students.
73	Students spend more class time working on problems in groups. Encourage peer tutoring during group-work time.
74	Students transferring from high school to Crafton are unprepared mathematically. Students lack the ability to do basic mathematic computations. Students also have a compulsion to use calculators without knowing basic calculations on their own as well as a lack of understanding how to enter certain calculations in a calculator.
75	Target was met so will continue with current SLO's
76	Target was met so will continue with the current SLOs.
77	The application problems was very help full and student will apply it to real life situations.
78	The class started out small, and kept getting smaller. My plan for the next semester is to engage with students in the beginning to be sure they are all getting the material from the every start.
79	The course may need to be offered in a longer format instead of 10-week format.
80	The hands on laboratory component was missing in the course which lead to the poorer results on laboratory equipment skills. When we are safe to have lab back in person, this should be enough to get the target met.
81	The students really enjoyed being back to a face to face class with the out door and team elements. In the future I hope to grow the class to the pre-covid size for better engagement and a higher level of competition with a broader learning curve.
82	These numbers are based upon the number of students who completed the math 141 - 70 class in Fall 2021.
83	this class had 6 "no show" students after the drop date passed. The 5 students that stayed in the class did not complete assignments.

	Proposed action would be to find a miracle way to inspire and motivate the students who simply do not care/can not care to study for the course.
84	This class is a spatial study of the Earth's dynamic physical systems and processes. Physical Geography is important because once we learn and understand how our Earth works, we can figure out ways to use these processes for our benefit. In addition, we can figure out solutions to problems that will enhance our days here on this Earth.
85	<p>This is a fundamental SLO, “the ability to apply mathematics to chemical measurements”. This Fall semester I created a math review, it was optional. So just a couple of students use it. I started with a full class, and lost 10 students by the end. Math reviews will get more emphasis next time.</p> <p>The SLO “the ability to do problems involving reaction stoichiometry” is essential for future chemistry classes. I think students could use a more discussion-based presentation of stoichiometry to clarify terminology.</p> <p>The SLO ‘comprehension and use of laboratory skills in synthetic, quantitative and instrumental methods as scientific approaches to gathering and verifying knowledge” in my view is the SLO that had suffered the most by doing virtual labs instead of a face-to-face lab. Techniques such “titrations” had not been giving the needed justice due to the lack of hands on. In this area, I am looking forward to teaching the lab face-to-face.</p>
86	This section was overall a pretty successful group of students.
87	This semester a large challenge was students doubting their capabilities, and not reaching out for help. To try to resolve this problem, there will be an assignment where they visit the tutoring center at least once (via online or in person), and to stop by office hours at least once in my future classes. My hopes are that if they know how to access some resources, they will be more willing to use their learning resources.
88	This semester I had better results with probability but my class had a tougher time with the hypothesis testing/confidence interval section. Part of those one's for SLO 3 are students who didn't show up for that Exam. But still I would like to rework some of my material there to have more of an emphasis on how confidence intervals and hypothesis testing are using some of the same methods.
89	This should be a half-semester long course.
90	This was high school class that had this class via zoom for zero period. I believe one of the main challenges was that this was a zero period class, and attendance was not its best. Perhaps we should consider offering these courses after their main classes instead of before?
91	<p>This was my first time teaching trigonometry in person! It made the experience much smoother than I had in previous remote years. The best SLO target was the second one which made sense since it is the first section we really cover. The other two sections had some lower results which was unfortunate. I feel like I spent too much two focusing on the different graphing rules and not enough of the students just going up and practicing their graphs. A bit more trial and error there for them would have maybe resulted in them identifying what common mistakes were and ironing out that process.</p> <p>The last section on solving trig equations was also skewed lower but by that point 3 students were not really showing up any more. Regardless of those students who didn't take that Exam I did see the rest of the class struggling and performing lower than before. It's a tough section and I feel like I can pass through it again and focus more on the main ways to solve equations.</p>

	There are many special cases which the book highlights but I think focusing on the main methods first and then going over whatever special cases I can would be better.
92	<p>To improve scores for the Application SLO, I will aim to give more low-stakes assessments, such as quizzes and group-work focused on identifying the type of problem students are solving, and applying the methods.</p> <p>To improve scores for the the Notational Literacy SLO, I will plan to give more creative assignments (of the discussion board, take-home, or written nature), challenging students to increased written communication of mathematics.</p>
93	To organize more practice of graphing by hand.
94	Try to get more students to persevere and complete the course since 2 students in this section choose to not take the final.
95	Try to get more students to persevere and complete the course since 3 students in this section choose to not take the final.
96	Try to get more students to persevere and complete the course since 4 students in this section choose to not take the final.
97	Use better technology
98	Use more time in class for students to work on problems in groups. Encourage peer tutoring during group-work time.
99	We may need to spend more time helping students recognize the various types of equations that are covered in Math 095, such as rational, quadratic, or radical equations. This will help them apply the appropriate strategy to solve these types of equations. Students may need more time to learn how to graph various functions such as quadratic, absolute value, and others. More practice solving application problems may be necessary.
100	Would establish better group activities to help the students who were having difficulties understanding the material.