Assessing SLOs

Math Department

SLO ASSESSMENT STRUCTURE

- Math Department offers many courses and many sections of each course.
- There is a lead instructor for each course the math department offers.
- The lead instructor is responsible for making sure each instructor of the course has the appropriate textbook, sample syllabi, and assists the instructor with assessing the SLOs when the course is up for SLO assessment.

Email Elements

- Inform the instructors of the CSLOs, PSLOs and ISLOs that are being assessed.
- Provide each instructor with the assessment questions and how the assessment should be proctored (i.e., as a quiz, test question, take home problem, etc.).
- Provide each instructor with a detailed rubric on how to grade the problem and on what defines meeting the SLO and not meeting the SLO.
- Provide the instructor with the goal for the percentage of students meeting the SLO.
- Finally, inform the instructor on how to record the results (filling out the online Google doc)

Closing the Loop

- The lead instructor and the instructors of the course discuss (face-to-face or through email) the findings.
- The lead instructor and the instructors for the course create goals for how to improve for the next assessment cycle.

CSLO's for Fall 2018

CSLO 1: Solve systems of equations and analyze the solution space.

1. Solve the system of equations. Describe your solution in terms of the free variables and what it means.

$$\begin{cases} x + y + 2z = 5 \\ x + z = -2 \\ 2x + y + 3z = 3 \end{cases}$$

CSLO 2: Perform matrix analyses of systems of equations.

2. Consider the system

$$\begin{cases} x + 2y + 3z = 6 \\ 2x + 5y + 3z = 7 \\ x \quad\quad + 8z = 14 \end{cases}$$

   (a) Write the system in the form $A\vec{x} = \vec{b}$

   (b) Find $\det A$ (A from part (a))

   (c) Based on your answer from part (b),

      i. How many solutions does this system have?

      ii. What is the rank of the matrix A?

      iii. What is the nullity of the matrix A?

      iv. Do the row vectors of A form a basis for A?

      v. Is $\lambda = 0$ and eigenvalue of A?

   (d) Find A^{-1} using elementary row operations.

   (e) Solve the system $A\vec{x} = \vec{b}$ using matrix multiplication.

Sample Email

Hello Math V22 Instructors!!!

If you were in attendance at the first department meeting of this year, you will recall the fact that Math V22 is one of the courses that will be assessing our CSLOs this semester. As the lead instructor for Math V22, let me mention a few important facts:

1. All teachers in Math V22 will be administering the exact same assessment. This assessment is attached.

2. All teachers in Math V22 must administer this assessment in the same format. I am going to ask that you give it in class as a quiz. You do not need to count this quiz as an actual grade in your course; that decision is up to you. But, each student must complete these 2 problems as a stand alone assessment, and it must be administered at the end of chapter 5. This must be done in an individual way, not in group work. Each student must fill out his or her own assessment.

3. I believe it is more fair to grade on a partial credit scale and assign each problem a value of 10 points. This allows for us to evaluate their work and the process, not just the final result. In this fashion, a student must get 14 points out of 20 to be considered at a satisfactory level. The goal that we are hoping to achieve with these 2 problems is 70% completing the problems at a satisfactory level.

Once you have completed giving this assessment (at the end of chapter 5), you must fill out the SLO Assessment Findings form. Below, please find the link:

https://docs.google.com/forms/d/e/1FAIpQLScDVpNRvYRFoUMfmgaUH9uOcx_F7m1n-ZXAJLIIFl8kCzK30w/viewform

You can email your results to me or place the form in my mailbox. Since we all cover chapter 5 late in the semester, I am going to give everyone a deadline of December 2nd to turn in the completed form.

Please let me know if you have any questions! I am happy to help.

Best Regards, Jack Bennett

Rubric for Assessment

1) Solution for CSLO #1
Guidelines for Assessing:
1 point for each of the correct row equivalent matrices (5 points total)
1 point for each of the correct solutions for x,y, and z (3 points total)
2 points for the description at the end (2 points total)

$$\begin{pmatrix} 1 & 1 & 2 & 5 \\ 1 & 0 & 1 & -2 \\ 2 & 1 & 3 & 3 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 1 & 2 & 5 \\ 0 & -1 & -1 & -7 \\ 0 & -1 & -1 & -7 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 1 & 2 & 5 \\ 0 & -1 & -1 & -7 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 1 & -2 \\ 0 & -1 & -1 & 7 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 1 & 2 & 5 \\ 0 & 1 & 1 & 7 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

Let $z = t$

Then, $y + z = 7$

$y + t = 7$

$y = 7 - t$

Also, $x + z = -2$

$x + t = -2$

$x = -2 - t$

So $\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -2 - t \\ 7 - t \\ t \end{pmatrix}$

This solution means there are infinitely many solutions to the system of linear equations and one parameter, or free variable, is required to describe the solution space.

2) Solution for CSLO #2
Guidelines for Assessing:
2 points each for parts (a)-(e).
For part (c), one point for 2 correct answers or two points for 4 to 5 correct answers.

a) $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 6 \\ 7 \\ 14 \end{pmatrix}$

b) $detA = -1$

c) i) Exactly one

ii) 3

iii) 0

iv) Yes

v) No

d) $A^{-1} = \begin{pmatrix} -40 & 16 & 9 \\ 13 & -5 & -3 \\ 5 & -2 & -1 \end{pmatrix}$

e) $\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -40 & 16 & 9 \\ 13 & -5 & -3 \\ 5 & -2 & -1 \end{pmatrix} \begin{pmatrix} 6 \\ 7 \\ 14 \end{pmatrix} = \begin{pmatrix} -2 \\ 1 \\ 2 \end{pmatrix}$