

Slippery Rock University
Department of Computer Science

The Computing major is accredited by ABET (the Accreditation Board for Engineering and Technology). All student outcomes, performance indicators, assessment methods (direct and indirect) and performance target have been reviewed and approved by ABET in 2023.

Assessment Process:

Student Outcomes, Performance Indicators and Associate Courses:

Table 1 Computing Student Outcomes with their Performance Indicators and the courses from which assessment data is collected and evaluated for each concentration.

Student Outcome (SO)	Performance Indicator (PI)	Concentration	Course	
SO#1 Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	PI#1. Analyze a complex computing problem	CS and CA IT	CPSC 374 CPSC 315	
	PI#2. Apply principles of computing and other relevant disciplines to identify solutions	CS and CA IT	CPSC 374 CPSC 317	
	SO#2 Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	PI#1. Design a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	CS, CA and IT	CPSC 146 CPSC 323
		PI#2. Implement a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	CS, CA and IT	CPSC 146 CPSC 323
SO#3 Communicate effectively in a variety of professional contexts.	PI#3. Evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	CS, CA and IT	CPSC 146 CPSC 323	
	PI#1. Write reports for final projects.	CS CA IT	CPSC 488 CPSC 405 CPSC 427	
		PI#2. Give oral presentations for final projects.	CS CA IT	CPSC 488 CPSC 405 CPSC 427
SO#4 SO#4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	PI#1. Recognize professional responsibilities	CS, CA and IT	CPSC 300	
	PI#2. Make informed judgments in computing practice based on legal and ethical principles	CS, CA and IT	CPSC 300	
SO#5 SO#5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline	PI#1. Attend team meetings	CS CA IT	CPSC 488 CPSC 405 CPSC 427	
	PI#2. Make contributions in group meetings			
	PI#3. Cooperate with the group effort			
	PI#4. Listen to his/her teammates' ideas and opinions respectfully and give them careful consideration			
	PI#5. Make a serious effort to fulfill his/her team role responsibilities on assignments			

Indirect assessment:

Indirect assessment is administered through surveys at sophomore, junior, and senior levels. The senior level survey is used to assess attainment of the SOs. The sophomore and junior level surveys are used as a baseline for the senior level survey. Table 2 shows the frequency of the Computing surveys. The surveys are administered by the assessment committee and conducted in D2L. The assessment committee works with the faculty teaching the courses that are used in the survey to get the students enrolled into the D2L survey shells. Faculty keep reminding their students to take the survey. Normally the survey is open for four weeks.

Table 2 below shows the frequency of the Computing surveys

Level	Courses
Sophomore	CPSC 207, beginning of Fall semester
Junior	CPSC 376 and CPSC 317, beginning of Fall semester
Senior/Graduate	End of Fall semester taken by graduation applicants. End of Spring semester taken by CPSC 427, CPSC 485 and CPSC 488 students

The survey questions are the exact SOs. SO#1 assessed with Q1 and Q2. SO#2 is assessed with Q3, Q4 and Q5. SO#3 is assessed with Q6. SO#4 is assessed with Q7 and Q8. SO#5 is assessed with SO#5. As with direct assessment, the SO metric goal from the survey is at least 75% of the students will agree or strongly agree (i.e., will have a favorable response of at least 75%)

Please answer the following questions:

#	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I am able to analyze complex computing problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	I am able to apply principles of computing and other relevant disciplines to identify solutions to computing problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	I am able to design a computing-based solution to meet a given set of computing requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	I am able to implement a computing-based solution to meet a given set of computing requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	I am able to evaluate a computing-based solution to meet a given set of computing requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	I am able to communicate effectively in a variety of professional contexts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	I am able to recognize the professional responsibilities in computing practice based on legal and ethical principles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	I am able to make informed judgments in computing practice based on legal and ethical principles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	I am able to function effectively as a member or leader of a team engaged in computing related activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 1 shows the survey questions:

Sophomore Fall 2023			SD	D	N	A	SA	A+SA	Ratio
Outcome#1	SO#1	Q1	0	2	9	18	7	25	0.694444
		Q2	1	0	6	22	7	29	0.805556
Outcome#2	SO#2	Q3	0	1	6	22	6	28	0.8
		Q4	0	2	6	22	5	27	0.771429
		Q5	1	4	3	20	7	27	0.771429
Outcome#3	SO#3	Q6	3	0	11	13	9	22	0.611111
Outcome#4	SO#4	Q7	0	3	5	13	15	28	0.777778
		Q8	1	1	7	18	9	27	0.75
Outcome#5	SO#5	Q9	0	1	7	20	8	28	0.777778

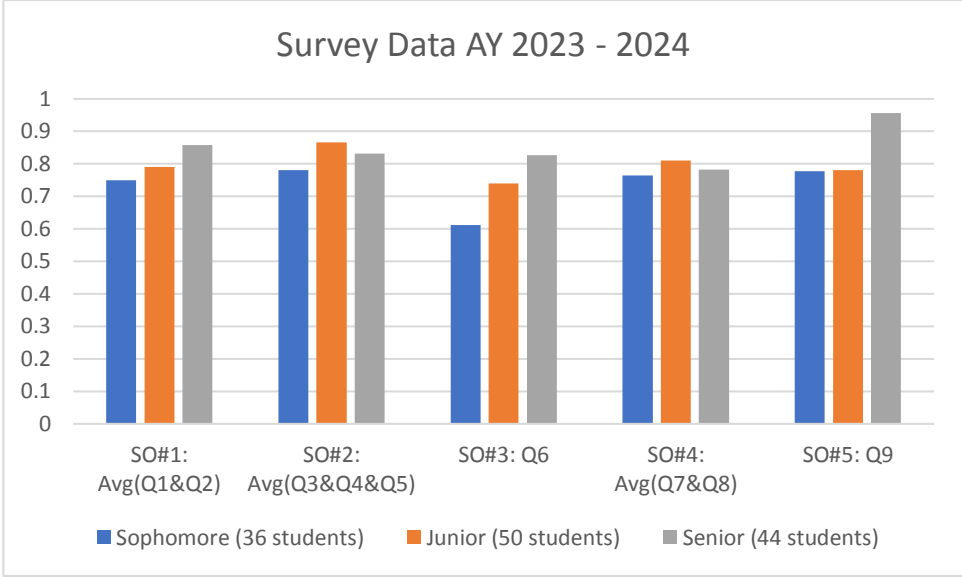
Figure 2: The SO evaluation data from the Sophomore survey (36 students)

Junior fall 2023			SD	D	N	A	SA	A+SA	Ratio
Outcome#1	SO#1	Q1	0	1	13	27	9	36	0.72
		Q2	0	1	6	33	10	43	0.86
Outcome#2	SO#2	Q3	0	1	5	35	9	44	0.88
		Q4	0	3	6	29	12	41	0.82
		Q5	0	1	4	37	7	44	0.897959
Outcome#3	SO#3	Q6	0	2	11	17	20	37	0.74
Outcome#4	SO#4	Q7	0	2	8	22	18	40	0.8
		Q8	0	3	6	24	17	41	0.82
Outcome#5	SO#5	Q9	0	2	9	23	16	39	0.78

Figure 3: The SO evaluation data from the Junior survey (50 students)

Senior fall 2023 and Spring 2024			SD	D	N	A	SA	A+SA	Ratio
Outcome#1	SO#1	Q1	0	1	5	26	14	40	0.869565
		Q2	0	5	2	23	16	39	0.847826
Outcome#2	SO#2	Q3	0	3	3	27	13	40	0.869565
		Q4	0	3	6	20	16	36	0.8
		Q5	0	1	7	22	16	38	0.826087
Outcome#3	SO#3	Q6	0	3	5	18	20	38	0.826087
Outcome#4	SO#4	Q7	0	3	7	18	18	36	0.782609
		Q8	0	4	6	18	18	36	0.782609
Outcome#5	SO#5	Q9	0	1	1	20	24	44	0.956522

Figure 4: The SO evaluation data from the Senior survey (44 students)



	Sophomore (36 students)	Junior (50 students)	Senior (44 students)
SO#1: Avg(Q1&Q2)	0.75	0.79	0.858695652
SO#2: Avg(Q3&Q4&Q5)	0.780952381	0.865986395	0.831884058
SO#3: Q6	0.611111111	0.74	0.826086957
SO#4: Avg(Q7&Q8)	0.763888889	0.81	0.782608696
SO#5: Q9	0.777777778	0.78	0.956521739

Direct assessment:

The Tables below show the data for the Fall 2023 and Spring 2024 with the action plan for each SO was not met:

Table 3 Assessment Data for Student Outcome 1

Performance Indicators	Concentration	Year/ Semester	Courses	Number of Students	Assignments / Tasks / Questions	Accomplished + Exemplary	Performance Target
PI#1. Analyze a complex computing problem	CS and CA	Fall 23	CPSC 374	16	Analyze a complex data structure with OOP	75%	75%
		Spring 24	CPSC 374	7		86%	
	IT	Spring 24	CPSC 315	16	Analyze the sequence and timing of processing in a digital electronic project	56.3%	75%
PI#2. Apply principles of computing and other relevant disciplines to identify solutions	CS and CA	Fall 23	CPSC 374	16	Implement a complex data structure with OOP	94%	75%
		Spring 24	CPSC 374	7		86%	
	IT	Fall 23	CPSC 317	18	Select among available scripting languages and utilities for the most appropriate language and integrate with markup languages	88.8%	75%

SO#1 evaluation and action plan:

Student attainment is above the desired threshold for performance indicators #1 for CS and CA concentrations. For IT concentration, the achievement rate is low 56.3%. The assessment committee reviewed the graded item and rubric, and they are appropriate. Survey results show no issues for performance indicators #1.

The committee suggests using in-class activities and hands-on exercises so students can receive feedback to improve before working on the graded items.

Student attainment is above the desired threshold for performance indicators #2 for CS, CA and IT concentrations.

We plan to publish the assessment data on the department webpage and share it with the advisory board members in Spring 2025.

Based on our assessment cycle, we will collect data and assess SO#1 in AY 2024-2025

Table 4 Assessment Data for Student Outcome 2

SO#2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.							
Performance Indicators	Concentration	Year/ Semester	Courses	Number of Students	Assignments / Tasks / Questions	Accomplished + Exemplary	Performance Target
PI#1. Design a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	CS, CA and IT	Fall 23	CPSC 146	12 20	Design an algorithmic solution to a problem using decomposition and step-wise refinement.	17% 10%	75%
		Spring 24	146	15 12 11		60% 92% 82%	
	CS, CA and IT	Fall 23	CPSC 323	19	Design a relational database to meet a given set of requirements	95%	75%
		Spring 24	CPSC 323	13 20		92% 95%	
PI#2. Implement a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	CS, CA and IT	Fall 23	CPSC 146	12 20	Implement program solution to an algorithm or design specification.	42% 60%	75%
		Spring 24	CPSC 146	15 12 11		67% 92% 91%	
	CS, CA and IT	Fall 23	CPSC 323	19	Implement the database	100%	75%
		Spring 24	CPSC 323	13 20		100% 95%	
PI#3. Evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	CS, CA and IT	Fall 23	CPSC 146	12 20	Examine the results of the program to ensure it meets program specifications and works for all experimental input data.	92% 85%	75%
		Spring 24	146-02	15		47%	
	CS, CA and IT	Fall 23	CPSC 323	19	Test the database	89%	75%
		Spring 24	CPSC 323	13 20		77% 95%	

SO#2 evaluation and action plan:

Data collected from CpSc 323 shows that student attainment is above the desired threshold for all three performance indicators for all three concentrations. Data collected from CpSc 146 is mixed and too low for some sections compared to CPSC 323 data and survey data. As CpSc 146 is an introductory course, it

would be more appropriate to replace CpSc 146 with an advanced course to measure the student attainment.

The committee suggests using CpSc 246 for CA and CA, CpSc 217 for IT and dropping the CPSC 146 starting in fall 2024

We plan to publish the assessment data on the department webpage and share it with the advisory board members in Spring 2025.

Based on our assessment cycle, we will collect data and assess SO#2 again in AY 2024-2025.

Table 5 Assessment Data for Student Outcome 3

SO#3: Communicate effectively in a variety of professional contexts.							
Performance Indicators	Concentration	Year/ Semester	Courses	Number of Students	Assignments / Tasks / Questions	Accomplished + Exemplary	Performance Target
PI#1. Write reports for final projects.	IT	Spring 24	CPSC 427	13	Develop a written report concerning capstone project	38.5%	75%
	CS	Fall 23	CPSC 488	9	Develop a written report concerning capstone project	78%	75%
		Spring 24	CPSC 488	26		88%	
CA	Fall 23	CPSC 405	21	Develop a written report concerning a semester long project	100%	75%	
PI#2. Give oral presentations for final projects.	IT	Spring 24	CPSC 427	14	Develop an oral report concerning capstone project	100%	75%
	CS	Fall 23	CPSC 488	9	Develop an oral report concerning capstone project	100%	75%
Spring 24		CPSC 488	26	100%			
	CA	Fall 23	CPSC 405	21	Develop an oral report concerning a semester long project	100%	75%

SO#3 evaluation and action plan:

Student attainment is above the desired threshold for performance indicators #1 for CS and CA concentrations. For IT concentration, the achievement rate is too low 38.5%. The assessment committee reviewed the graded item and rubric, and they are appropriate. Survey results show no issues for performance indicator #1.

The committee suggests using a few milestones for the final project report so students can deliver the final report in phases and receive feedback to improve their final submission.

Student attainment is above the desired threshold for performance indicator #2 for CS, CA and IT concentrations.

We plan to publish the assessment data on the department webpage and share it with the advisory board members in Spring 2025.

Based on our assessment cycle, we will collect data and assess SO#3 again in AY 2025-2026.

Table 6 Assessment Data for Student Outcome 4

SO#4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.							
Performance Indicators	Concentration	Year/ Semester	Courses	Number of Students	Assignments / Tasks / Questions	Accomplished + Exemplary	Performance Target
PI#1. Recognize professional responsibilities	CS, CA and IT	Fall 23	CPSC 300	23	Discussion activity about recognizing professional responsibility	74%	75%
		Spring 24	CPSC 300 -88	11	Discussion activity about recognizing professional responsibility	82%	75%
			CPSC 300-89	10	Discussion activity about recognizing professional responsibility	100%	
PI#2. Make informed judgments in computing practice based on legal and ethical principles	CS, CA and IT	Fall 23	CPSC 300	25	Essay writing questions about legal and ethical principles	96%	75%
		Spring 24	CPSC 300-88	10	Essay writing questions about legal and ethical principles	100%	75%
			CPSC 300-89	10	Essay writing questions about legal and ethical principles	100%	

SO#4 evaluation and action plan:

The achievement rate is minimally below the threshold for performance indicator #1 for one section out of three. Overall, the Student attainment is above the desired threshold for performance indicators #1 and #2 in fall 2023 and spring 2024.

We plan to publish the assessment data on the department webpage and share it with the advisory board members in Spring 2025.

Based on our assessment cycle, we will collect data and assess SO#4 again in AY 2025-2026.

Table 7 Assessment Data for Student Outcome 5

SO#5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline							
Performance Indicators	Concentration	Year/ Semester	Courses	Number of Students	Assignments / Tasks / Questions	Accomplished + Exemplary	Performance Target
PI#1. Attend team meetings	IT	Spring 24	CPSC 427	13	Attend team meetings	92.3%	75%
	CA	Fall 23	CPSC 405	21	Attend team meetings	95%	75%
	CS	Fall 23 Spring 24	CPSC 488 CPSC 488	9 26	Attend team meetings	100% 92%	75%
PI#2. Make contributions in group meetings	IT	Spring 24	CPSC 427	13	Make contributions in group meetings	84.6%	75%
	CA	Fall 23	CPSC 405	21	Make contributions in group meetings	90%	75%
	CS	Fall 23 Spring 24	CPSC 488 CPSC 488	9 26	Make contributions in group meetings	89% 88%	75%
PI#3. Cooperate with the group effort	IT	Spring 24	CPSC 427	13	Cooperate with the group effort	84.6%	75%
	CA	Fall 23	CPSC 405	21	Cooperate with the group effort	100%	75%
	CS	Fall 23 Spring 24	CPSC 488 CPSC 488	9 26	Cooperate with the group effort	100% 92%	75%
PI#4. Listen to his/her teammates' ideas and opinions respectfully and give them careful consideration	IT	Spring 24	CPSC 427	13	Listen to his/her teammates' ideas and opinions respectfully and give them careful consideration	100%	75%
	CA	Fall 23	CPSC 405	21	Listen to his/her teammates' ideas and opinions respectfully and give them careful consideration	100%	75%

	CS	Fall 23	CPSC 488	15	Listen to his/her teammates' ideas and opinions respectfully and give them careful consideration	100%	75%
		Spring 24	CPSC 488	26		96%	
PI#5. Make a serious effort to fulfill his/her team role responsibilities on assignments	IT	Spring 24	CPSC 427	13	Make a serious effort to fulfill his/her team role responsibilities on assignments	84.6%	75%
	CA	Fall 23	CPSC 405	21	Make a serious effort to fulfill his/her team role responsibilities on assignments	95%	75%
	CS	Fall 23	CPSC 488	9	Make a serious effort to fulfill his/her team role responsibilities on assignments	89%	75%
	Spring 24	CPSC 488	26	85%			

SO#5 evaluation and action plan:

Student attainment is above the desired threshold for all five performance indicators for CS, CA and IT concentrations.

We plan to publish the assessment data on the department webpage and share it with the advisory board members in Spring 2025.

Based on our assessment cycle, we will collect data and assess SO#5 again in AY 2025-2026.

Assessment Cycle:

AY 2023-2024 we are collecting data and assessing all five student outcomes.

AY 2024-2025 – collecting data and assessing SO#1 and #2

AY 2025-2026 – collecting data and assessing SO#3, #4 and #5

AY 2026-2027 and 2027-2028 collecting data and assessing all five outcomes to prepare the self-study report for the re-accreditation process.

Table 8 Assessment Cycles for Student Outcomes

SOs	AY 2023-2024	AY 2024-2025	AY 2025-2026	AY 2026-2027	AY 2027-2028
SO#1: Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.	X	X		X	X
SO#2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	X	X		X	X
SO#3: Communicate effectively in a variety of professional contexts.	X		X	X	X
SO#4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	X		X	X	X
SO#5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	X		X	X	X