Student Outcomes Assessment and Success Report AY2017-18   *Completed reports due from the dean to the Assessment Office via Blackboard by October 15. Deans, assessment coordinators, and/or department chairs set their own internal deadlines for material review and request for refinement if not suitably addressing questions.*

Unit/Program Name: __Computer Science BS_____   **Contact Name(s) and Email(s)** _____Jeff Kinne, jkinne@indstate.edu_____

Before you complete the form below, review your outcomes library and curriculum map to ensure that they are accurate and up to date. If not, you may submit a new version along with this summary. Templates are available on the assessment website.

Part 1a: Summary of Assessment Activities

a. What learning outcomes did you assess this past year? If this is a graduate program, identify the **Graduate Student Learning Outcome** each outcome aligns with.	b. (1) What assignments or activities did you use to determine how well your students attained the outcome? (2) In what course or other required experience did the assessment occur?	c. What were your expectations for student performance?	d. What were the actual data/results?	e. What changes or improvements were made or will be made in response to these assessment results or feedback from previous year's report?
1A - Basic Programming	Programming quiz given in CS 202 and CS 499.	All students get at least 3 out of 5 programs correct, and the other 2 at least half correct.	All 19 students who took CS 202 took and passed the assessment. 2 students took CS 499 and passed the assessment (CS 499 is a recent addition to the program).	The programming assessment is now required and must be passed as part of the courses CS 202 (sophomore year) and CS 499 (senior year). The focus in 2017-2018 was on developing the programming assessment.
	Exit Survey question 6a	Average response on Exit Survey at or above "Mostly Mastered"	Responses for full, mostly, somewhat, no mastery: 3,3,0,0	
1B - Programming Paradigms	Exit Survey question 6b	Average response on Exit Survey at or above "Mostly Mastered"	Responses for full, mostly, somewhat, no mastery: 1,4,1,0	
2A - Data Structures	Exit Survey question 6c	Average response on Exit Survey at or above "Mostly Mastered"	Responses for full, mostly, somewhat, no mastery: 0,4,1,1	
2B - Algorithms Analysis	Exit Survey question 6d	Average response on Exit Survey at or above "Somewhat Mastered"	Responses for full, mostly, somewhat, no mastery: 0, 1, 5, 0	

3A - Architecture	Exit Survey question 6e	Average response on Exit Survey at or above "Mostly Mastered"	Responses for full, mostly, somewhat, no mastery: 1,3,2,0	
3B - Operating Systems	Exit Survey question 6e	Average response on Exit Survey at or above "Mostly Mastered"	Responses for full, mostly, somewhat, no mastery: 1,3,2,0	
3C - Programming Design in Specialized Areas	Exit Survey questions 6g, 6h, 6i, 6j, and 6l	Average response on Exit Survey at or above "Somewhat Mastered" for each question.	Responses for full, mostly, somewhat, no mastery: 3,1,2,0 (database) 3,3,0,0 (web) 1,0,5,0 (networking) 0,0,3,3 (graphics) 1,3,2,0 (unix/linux)	
3C - Advanced Algorithms and Theory	Exit Survey questions 6m, 6n, and 6o	Average response on Exit Survey at or above "Somewhat Mastered"	Responses for full, mostly, somewhat, no mastery: 0,2,2,2 (algorithms) 1,0,2,2 (models of computation) 0,1,3,1 (formal methods)	

Note: *If you would like to report on more than three outcomes, place the cursor in the last cell on the right and hit "tab" to add a new row.*

Notes
  a. Use your outcomes library as a reference.
  b. Each outcome must be assessed by at least one direct measure (project, practica, exam, performance, etc.). If students are required to pass an examination to practice in the field, this exam must be included as one of the measures. At least one of the program's outcomes must use an indirect measure (exit interview, focus group, survey, etc.). Use your curriculum map to correlate outcomes to courses.
  c. Identify the score or rating required to demonstrate proficiency (e.g., Students must attain a score of "3" to be deemed proficient; at least 80% of students in the program will attain this benchmark."
  d. Note what the aggregate level of proficiency actually was and the number of students included in the cohort or sample (e.g., "85% of the 25 students whose portfolios were reviewed met the established benchmark").

Part 1b: Continuous Quality Improvement
In no more than one page, summarize 1) the discoveries assessment has enabled you to make about student learning (a. What specifically do students know and do well—and less well? b. What evidence can you provide that learning is improving?); 2) what your assessment plan will focus on in the coming year; and 3) how will this information be shared with other stakeholders?

In 2016-2017, a programming assessment was given of all students at two key points – once during their second year and once right before graduating. The assessment was developed to measure the most basic and important programming and algorithms skills. The average score on the programming assessment in 2016-2017 was 2.2 out of 5. The faculty found this to be unacceptable. A decision was made to require a score of 4 out of 5 to move on (earn a C or better) in the CS program in the sophomore course CS 202 Computer Science II, and to pass the senior course CS

499 Senior Seminar. The faculty provided numerous solved sample problems, provided notes and advice on techniques, and provided screen capture videos of problems being solved. During the fall 2017 semester, the assessment was given a total of 7 times. Students kept taking the assessment and working on their program until they were able to pass. In the spring 2018 semester, a similar schedule was followed.

We are very happy to report that all students enrolled in the key courses were able to pass the programming assessment. We view the process as a great success. It has been a lot of work for the faculty and students, but it has resulted in much higher performance in the key area of programming and algorithms.

For 2018-2019, we will keep a focus on the programming assessment to ensure the assessment continues as both a formative and summative assessment and does not become a barrier to progressing through the program. We also are considering adding a second component that focuses more on problem solving.

Given the success of the programming assessment, we plan to discontinue using the MFT. The data from the MFT was too coarse to be useful in making decisions about which topics need more emphasis (and how). Now that we have a good start developing and administering our own custom-designed assessment, we will keep going in this direction.

We will continue to make use of the exit survey. This has been valuable data in allowing us to see how students see their skills across computer science.

Part 2a: Summary of Student Success Activities
Based on the results of your assessment of student learning outcomes from Part 1 above, reflect on how this data will impact student success within your unit/program.

a. What goals/objectives were established this past year to aid student performance, retention, persistence, and completion?	b. What primary action steps were taken to make progress on each goal and who was responsible?	c. What data informs progress on each goal?	d. What were some accomplishments or achievements for each goal and/or challenges confronted?	e. Please indicate goals that are continuing and any goals that will replace a previous goal. Any additional goals can also be added on a new line.
1. All students pass the programming assessment by the end of CS 202, and at graduation.	Prep materials provided, practice sessions. Coordinated by Jeff Kinne in fall, Rob Sternfeld in spring.	Scores on the programming assessment for all students who took it.	All students in the key courses passed the programming assessment.	Goal remains the same – all students pass the programming assessment by the end of CS 202 and by graduation.
2. All students are ready to apply for jobs by graduation.	Embed resume writing, interviewing, and job search into senior seminar.	Fulfilling career readiness requirements.	We have identified more career readiness goals than	We are considering making the senior seminar 3 credits to have enough time to do

			comfortably fit in a 1 credit seminar.	more career readiness activities.
3. Clear communication on advising.	Program websites with program and advising information. Email list of students to communicate key information.	NA	NA	We will be doing an overhaul of all of our online information to reorganize and make sure it is clear.
4. Review and update of course syllabi and learning outcomes.	Perform a review of course syllabi and learning outcomes.	NA	Developed a standard syllabus template for CS courses, and reviewed learning outcomes for key courses.	Continue to review and update learning outcomes for CS courses.

Notes
  a. These goals could be program/department wide but may also be focused on specific sub-populations of interest (e.g., service course student performance, transfer students, part-time students, students of a particular class year, students of color, etc.).
  c. Retention and completion data, D/F/drop rates, credit hour productivity (defined as credit hour enrollment at start of term versus credit hours earned at end of term) are common data examples. See Blue Reports database (access from Linda Ferguson in Institutional Research) or the Office of Institutional Research for ideas.

Part 2b: Continuous Quality Improvement

In no more than one page, summarize 1) the discoveries that attention to student performance, retention, persistence, and completion has enabled you to make about program/department systems, processes, and norms as it effects students; and 2) how this will positively impact student success, including with regard to the readiness of students for graduate study or a career?

We have focused on relatively common sense things that should be done to help students. We have a tutoring lab that is open 30+ hours per week and is well advertised. We have clear advising information on our website and communicated by email to all CS majors, linked off of our homepage - http://cs.indstate.edu/info/
We plan to make a major overhaul of the information on our website, putting it into a wiki format that is easier to keep up to date. Our work in progress is at http://cs.indstate.edu/wiki/index.php/Main_Page

We are considering a major revision to the CS major to better fit student demand. Presently students must choose between CS and IT as their only options related to computing. The CS major is a traditional major that has a focus on systems and theory in addition to applications. The IT major is focused on administration and support. We are considering making the core part of the CS major smaller and splitting the upper-division requirements into more concentrations – so students have a major and concentration that is a closer fit to the part of computing they want to specialize in. We have collected survey data from students on their preferences. The data suggests that there is not a single area of computing that is the most popular; on the contrary it is likely that the biggest payoff would be to have a variety of concentrations for students to choose from.

We are also evaluating our service courses. We currently teach courses for IT and few other tech majors. We have been in discussions with the IT faculty to make sure the service courses meet their needs. We are also sensitive to the needs of science programs, which do not explicitly require any CS courses but help students choose the right options through advising.

We have constituted an advisory board that is consulted about program assessment and other issues. The advisory board is listed at http://cs.indstate.edu/info/advisory-board.html
The advisory board has responded to the college's request for alumni mentors. The CS alumni mentors are listed at https://www.indstate.edu/cas/mentors/mathcs

Our faculty pay close attention to faculty trends to make sure our students are competitive for jobs and graduate programs. Companies our students have been placed in are listed at http://cs.indstate.edu/info/after-isu.html#alumniJobs

We have developed a syllabus template that meets all CS courses now use - https://docs.google.com/document/d/1VmSebAOSwdViyQJ0kCdPiIlYmA2sx0ieR_zg8MzFrYo/edit
We have also begun a review of all course descriptions and learning outcomes - https://docs.google.com/document/d/1IuwTgm3GItR0j-wD64Q3MHPAAnjOb8L6OrFJ2YV6UXY/edit?usp=sharing

Please prepare this report as a Word document. Do not include any attachments. Instead, provide links to important supporting materials
(e.g., detailed—but not student-specific--assessment results; rubrics; minutes; etc.), or upload them to the college's assessment site in Blackboard.

Dear Jeff,

Thank you so much for sharing your assessment process and findings for AY 2017-18 with the Assessment and Student Success Councils. You will find a comprehensive synthesis of the feedback compiled by both groups below. It is understood that some of the feedback might encompass practices that you already engage in but that are not documented in this report. As the purpose of this evaluation is focused on recognizing great work and helping faculty improve assessment practice, it is not necessary to retroactively add documentation. Please feel free to let me know if you have any questions or if there is any way I can assist you in further developing assessment in your program.

This report will be shared with the Associate Dean(s) and Dean of your college and summarized findings will be shared as composite college/institutional data with the President's Office and the Provost's team.

Sincerely,

Kelley (x7975)

Program: BS Computer Science

Assessment Practice Overall Rating: Developing (1.625/3.00)
Student Success Practice Overall Rating (comments below in blue): Mature (2.75/3.00)

Strengths	Recommendations
- Clear identification of the courses and assessments that will be used to assess student learning. Good mix of direct measures across different courses and the indirect measure of the exit survey. - Clearly stated expectations for student performance and actual student performance data in relation to the expectations. - Good note about the development of the new programming assessment requirement to give context for its use. - Excellent information about how the addition of a second point of testing and a required score on the first point for moving on. The activities the faculty engage in to improve student performance are excellent, data-informed examples of continuous improvement practice. **Excellent student success goals that cover a variety of typical success challenges – learning, timely persistence, graduation, and career readiness.** **Great strategies for achieving student success goals with data already showing some success.** **Great use of data to inform decisions, as in using the survey to determine whether to more concentrations in the major.**	- What you have listed as outcomes are not written as learning outcomes. These might be the areas under which you would group learning outcomes. In order to be measurable, learning outcomes should specifically describe what you want students to do at a specific level of mastery to demonstrate learning. I'm not a CS person, but for 1A Basic Programming, a learning outcome might be "Students will create working code for an application." - Provide additional information about the evaluation of the assessments. It looks like the programming quiz is an applied practice where the programs need to work to be considered correct and that the exit survey used a Likert scale. - Provide information about how the findings of this report were shared with faculty. - Describe how the analysis of exit survey findings has been interpreted and what has been learned from it. **For each success goal, list the faculty involved as was done for the first goal.**

• **Excellent use of website and advising for supporting student success.** • **Great note about working collaboratively with IT faculty to understand cross-cutting needs.**	

Assessment (Parts 1a & 1b) Scoring Rubric is included below. Student Success (Parts 2a & 2b) Scoring Rubric is included below with no notations just for your reference (the SSC did not choose to report in this way).

Score was calculated on a 0 (undeveloped), 1 (developing), 2 (mature), 3 (exemplary) scale.

Evaluation Criteria	Exemplary	Mature	Developing	Undeveloped
Student Learning Outcomes	At least one learning outcome that is aligned with program coursework is assessed this cycle.

Learning outcome(s) is specific, measureable, and student-centered.

Rationale for assessment of this outcome(s) is made clear (ex: it is part of a standing assessment cycle, a need was identified, etc.)

Learning outcome(s) directly link to college, institutional, and/or accreditor goals/standards. | At least one learning outcome that is aligned with program coursework is assessed this cycle.

Learning outcome(s) is specific, measureable, and student-centered.

Rationale for assessment of this outcome(s) is made clear (ex: it is part of a standing assessment cycle, a need was identified, etc.) | At least one learning outcome that is aligned with program coursework is assessed this cycle.

Learning outcomes(s) is measurable. | No learning outcomes are identified for assessment or the outcomes that are identified are not linked to program outcomes aligned with program coursework (e.g. – curriculum map) or are not measurable. |
| **Performance Goals & Measures** | Performance goal identified for each learning outcome is clear and reasonable (ex: based on previous performance data, professional standards, etc.).

Identified measures are designed to accurately reflect student learning, including at least one direct measure.

Tools used to measure student performance are described and were reviewed for validity or trustworthiness prior to use (note this in the report; attach tools if applicable – ex: rubrics, checklists, exam keys, etc.). | Performance goal identified for each learning outcome is clear and reasonable (ex: based on previous performance data, professional standards, etc.).

Identified measures are designed to accurately reflect student learning, including at least one direct measure.

Tools or processes for evaluating student performance on measures are described (attach tools if applicable – ex: rubrics, checklists, exam keys, etc.). | Performance goal(s) is identified for each learning outcome.

Identified measures (ex: assignments, projects, tests, etc.) are poorly suited to performance goals or are solely indirect measures.

Tools or processes for evaluating student performance on measures are not described. | No goals for student performance of learning outcomes is identified, and/or no measures are provided. |

Analysis & Results	Data is collected using the measures and tools identified. Results are reported with clear description of quality analysis (e.g., analysis follows accepted statistical or qualitative procedures). Results are shared in relation to performance goals. Results are discussed in relation to college, institutional, and/or accreditor goals/standards.	Data is collected using the measures and tools identified. Results are reported with clear description of analysis (e.g., analysis follows accepted statistical or qualitative procedures). Results are shared in relation to performance goals.	Data is collected using the measures and tools identified. Results are reported with little description of analysis.	No data is being collected. No results are provided.
Sharing & Use of Results for Continuous Improvement	Clear information is provided about sharing and using results to inform practice. Discussion of what was learned from results is provided and connected to plans for sharing and using results to inform practice. A plan for adjusting performance, goals, assessment, and/or program components based on results is outlined.	Clear information is provided about sharing and using results to inform practice. Discussion of what was learned from results is provided and connected to plans for sharing and using results to inform practice.	Limited information is provided about sharing or using results to inform practice. Some discussion of what was learned from results is provided.	No information is provided about sharing or using results to inform practice. No evidence of reflection on results is provided (ex: discussion, conclusions drawn)
Overall Rating	□ Exemplary	□ Mature	X Developing	□ Undeveloped

Student Success Activities Report Rubric (Part 2 of Student Outcomes Assessment Report)**Unit/Program:**
Office of Student Success/Office of Assessment & Accreditation Evaluation Date:

Evaluation Criteria	0 Undeveloped	1 Developing	2 Mature	3 Exemplary
Goals/ Objectives	No goals/objectives are identified.	Goals/objectives are poorly suited to addressing student performance, retention, persistence, and/or completion. Goals/objectives may also be modest at best such that little effort is required.	Goals/objectives are generally clear and reasonably well suited to addressing student performance, retention, persistence, and/or completion. Goals/objectives are also generally at least moderately aggressive such that appropriate effort is required.	Goals/objectives are all clear and well suited to addressing student performance, retention, persistence, and/or completion. Goals/objectives are also at least moderately aggressive in all cases such that appropriate effort is required.
Action Steps	No action steps are identified.	Action steps are weak, underdeveloped, and/or poorly suited to making progress on goals/objectives. No person(s) or group(s) indicated who will be responsible for the actions.	Action steps are generally clear and reasonably well suited to making progress on goals/objectives. Person(s) or group(s) responsible for the actions are indicated in most cases.	Action steps are all clear and well suited to making progress on goals/objectives Person(s) or group(s) responsible for each action are indicated, ideally with a timeline.
Data that Informs Progress on Each Goal/Objective	No data, quantitative or qualitative, is identified.	Data to inform progress are poorly suited to measure progress on goals/objectives.	Data to inform progress are generally well suited to measure progress on goals/objectives.	Data to inform progress are all well suited to measure progress on goals/objectives.
Assessment of Outcomes and Continuous Improvement	For goals/objectives in place the prior year, no reflection provided on achievements/challenges, sharing results, and/or plans for improvement or change based on results. No reflection on outcome assessment plan for continuous improvement provided for new goals/objectives.	For goals/objectives in place the prior year, modest at best reflection provided (and/or is vague or of questionable connection to results) on achievements/challenges, sharing results, and/or plans for improvement or change based on results. Modest at best reflection on assessment plan for continuous improvement provided for new goals/objectives.	For goals/objectives in place the prior year, generally appropriate reflection provided (and is reasonably well connected to results) on achievements/ challenges, sharing results, and/or plans for improvement or change based on results. Reasonable reflection on assessment plan for continuous improvement provided for new goals/objectives.	For goals/objectives in place the prior year, strong reflection is provided in all cases (and is well connected to results) on achievements/challenges, sharing results, and/or plans for improvement or change based on results. Well-developed reflection on assessment plan for continuous improvement provided for new goals/objectives.
Overall Rating	**□ Undeveloped**	**□ Developing**	**□ Mature**	**□ Exemplary**