

Degree Program Name: ___BS in Computer Science Contact Name and Email ___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.

Part One

<p>a. What learning outcomes did you assess this year? If this is a graduate program, indicate the Graduate Student Learning Outcome* each outcome aligns with.</p>	<p>b. (1) What method(s) did you use to determine how well your students attained the outcome? (2) In what course or other required experience did the assessment occur?</p>	<p>c. What expectations did you establish for achievement of the outcome?</p>	<p>d. What were the actual results?</p>	<p>e. (1) Who was responsible for collecting and analyzing the results? (2) How were they shared with the program’s faculty?</p>
<p><u>1A - Basic Programming</u></p>	<p>MFT subscore for “Programming and Software Engineering”</p> <p>Programming quiz given in CS 202.</p> <p>Exit Survey question 6a</p>	<p>Average MFT sub-score value above 50th percentile</p> <p>All students get at least one of 5 problems correct. Average score at least 2 out of 5.</p> <p>Average response on Exit Survey at or above “Mostly Mastered”</p>	<p>5 students who finished between 201501-201605 (of 15 total who graduated) completed the CS MFT. Average sub-score was 57th percentile. Students who took the test were roughly representative.</p> <p>15 (mostly sophomore) students took the programming quiz. 11 got at least one problem correct; the other 4 got at least one problem ½ correct. The average score was 2.2 out of 5 (up from 1.8 last year).</p> <p>7 of 15 graduating students completed the Exit Survey. Of these all answered at or above “Mostly Mastered”.</p>	<p>Program director Jeff Kinne administers MFT, collects Exit Survey data, and emails results to program faculty.</p>

<u>1B - Programming Paradigms</u>	MFT subscore for “Programming and Software Engineering”	Average MFT sub-score value above 50 th percentile	Average sub-score was 57 th percentile	
-----------------------------------	---	---	---	--

	Exit Survey question 6b	Average response on Exit Survey at or above “Mostly Mastered”	All answered at or above “Mostly Mastered”.	
--	-------------------------	---	---	--

<u>2A - Data Structures</u>	MFT subscore for “Discrete Structures and Algorithms”	Average MFT sub-score value above 50 th percentile	MFT Sub-scores were not available because not enough students took the MFT.	
	Exit Survey question 6c	Average response on Exit Survey at or above “Mostly Mastered”	2/7 each answers “full”, “mostly” and “somewhat” mastered. 1 chose NA.	

<u>2B - Algorithms Analysis</u>	MFT subscore for “Discrete Structures and Algorithms”	Average MFT sub-score value above 50 th percentile	Average sub-score was 43 rd percentile.	
	Exit Survey question 6d	Average response on Exit Survey at or above “Somewhat Mastered”	Responses for full, mostly, somewhat, no mastery: 0, 2, 3, 2	

<u>3A - Architecture</u>	MFT subscore for “Systems (Architecture, Operating Systems, Networking, Database)”	Average MFT sub-score value above 50 th percentile	Average sub-score was 43 rd percentile.	
	Exit Survey question 6e	Average response on Exit Survey at or above “Mostly Mastered”	Responses for full, mostly, somewhat, no mastery: 1, 3, 2, 1	

<u>3B - Operating Systems</u>	The MFT subscore for “Systems (Architecture, Operating Systems, Networking, Database)” Exit Survey question 6e	Average MFT sub-score value above 50 th percentile Average response on Exit Survey at or above “Mostly Mastered”	Average sub-score was 43 rd percentile. Responses for full, mostly, somewhat, no mastery: 1, 3, 2, 1	
<u>3C - Programming Design in Specialized Areas</u>	MFT subscore for “Systems (Architecture, Operating Systems, Networking, Database)” Exit Survey questions 6g, 6h, 6i, 6j, and 6l	Average MFT sub-score value above 50 th percentile Average response on Exit Survey at or above	Average sub-score was 43 rd percentile. At least 1 student and no more than 2 (out of 7) for	
		“Somewhat Mastered” for each question.	each question answered “no mastery”. Web Programming scored highest, with 4/7 indicating full mastery.	
<u>3C - Advanced Algorithms and Theory</u>	Exit Survey questions 6m, 6n, and 6o	Average response on Exit Survey at or above “Somewhat Mastered”	Out of 7, 3 indicated no mastery for algorithm design, 5 indicate no or low mastery of models of computation.	

* See <https://www2.indstate.edu/graduate/forms/review.pdf>.

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

- Use your outcomes library as a reference.
- 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 outcomes must use an indirect measure (exit interview, focus group, survey, etc.). Use your curriculum map to correlate outcomes to courses.
- 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.”
- 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).

- e. This may be a specific individual, a position (e.g., assessment coordinator), or a group such as the department assessment committee. Minutes should reflect that results are shared with members of the department at least annually.

Part Two

In no more than one page, summarize 1) the discoveries assessment has enabled you to make about your students' learning, the curriculum, departmental processes, and/or the assessment plan itself; 2) the changes and improvements you have made or will make in response to these discoveries and/or the coordinator's feedback on the previous summary; and 3) what your assessment plan will focus on in the coming year.

If you would like to reference any supporting materials (departmental meeting minutes, detailed assessment results, etc.), please provide the URL at which they can be found.

Response to comments from 2015-2016 assessment. The Outcomes Library has been updated to be more “active”, describing what students can *do* rather than what they are exposed to. All assessment measures are currently voluntary for students. They will be required for CS 499 Senior Seminar (students will receive incomplete if not completed), but the course is only a required course for those who began in 2016 or later.

Further discussion of this year's results. We are still in the “developing” stages in terms of integrating our assessment practices into the curriculum. The faculty have very frequent (at least weekly) informal conversations about student learning, program strengths/weaknesses, etc. These informal discussions are currently effectively driving curriculum changes, but we can do better at using quantitative data.

This is the first year that we have sub-score data from the MFT, with 5 students having completed the test. The 5 students who completed the test were fairly representative, with two of our stronger students, one of the weakest, and two intermediate. The average sub-scores were near 50% in all areas. The percentiles of the 5 students were: 95, 83, 39, 16, 8. The list of schools that use the MFT in CS do look comparable to ISU on the whole. We ran a comparative analysis for 10 schools specifically chosen to be comparable to ISU; the average raw score for the comparable schools was 147, while the ISU average score was 150. The comparable schools also scored slightly stronger on the “programming and software engineering” sub-score than the other sub-scores, which is also true for ISU. The MFT data suggests that ISU graduates are comparable to those from other institutions in their preparation. This corresponds with the qualitative opinion of the faculty. We do believe we can come out ahead of the comparable schools by putting into place a number of ideas we are discussing (and discussed here).

The exit survey shows that students have the lowest confidence for the learning outcomes that are specific to the concentrations. The exit survey currently does not differentiate based on concentration. We should differentiate based on the concentration next year.

The results from the programming assessment quiz are not as good as we would like. The programming assessment was also given in the CS 499 Senior Seminar class. Students in CS 499 performed better, but not as good as hoped. The faculty are discussing honing in on a small number of extremely important outcomes to emphasize to the students and to integrate as “checkpoints” for graduating students (i.e., students will receive an incomplete in CS 499 until they can pass the programming assessment [which most would have done already in earlier semesters]).

In terms of the concentrations, we are also seeing a wide disparity in the students. Roughly 1/3 of the students thrive in the program as it is, a traditional CS program. Roughly 1/2 to 2/3 of the students really want a program that is in between CS and IT. A survey was given to current and recent students, and a large fraction indicated that they would have chosen a different major if there were more options. We are considering having two separate (but tightly connected) majors rather than just two concentrations. We would probably be able to use the same CIP code, so we would probably not need ICHE approval.

We are currently undertaking a review of our core introductory sequence to ensure the important learning outcomes are stressed. We are mapping a detailed list of standard learning outcomes from our professional society to the ISU courses.

For the first course, CS 151, we implemented a policy of allowing students to switch to CS 101 after the 5th week if they are struggling and need more help before taking CS 151. The results are not conclusive as to how positive this has been. Students who switched to CS 101 in the fall and then took CS 151 in the spring earned (on a 4.0 scale) an average of 2.55 in CS 101 and then an average of 1.39 in CS 151. Students who stayed in CS 151 in the fall and then needed to repeat it the spring earned an average of 0.5 in the fall and then an average of 1.25 in the spring. Of students who took CS 101 in the fall and then 151 in the spring, 43% earned a C or higher, while 52% dropped or failed CS 151. The overall drop/fail rate for CS 151 for the year was around 47%. We conjecture that the largest impediment to student success in CS 151 is spending enough time on the course. We plan to more closely track student time spent in the programming lab to try to better inform students whether they are spending enough time on the course.

We have described a great deal of work on our program in the year ahead. On a positive note, our strong to intermediate students have had a great deal of success obtaining good jobs after graduating, and the weaker students are able to continue into the MS to improve their prospects. Much of the work that we have described focuses on trying to pull up and better prepare the weaker students. In recent years, our BS graduates have been GAs in our MS program and have been offered positions at Google, Infracore, Naval Surface Warfare – Crane Division, Liberty Mutual, ISU Communications & Marketing, Vincennes University, Interactive Intelligence, and FireEye.

Student Learning Summary Report Rubric :: Office of Assessment & Accreditation :: Indiana State University

Degree Program: BS in Computer Science Date: 01.14.18

	Level 0 – Undeveloped	Level 1 – Developing	Level 2 – Mature	Level 3 – Exemplary
1. Student Learning Outcomes	<input checked="" type="checkbox"/> No outcomes were identified in this report. <input type="checkbox"/> No Curriculum Map was provided.	<input type="checkbox"/> Outcomes were identified. <input type="checkbox"/> Some of the outcomes are specific, measurable, student-centered, program-level outcomes. <input type="checkbox"/> A Curriculum Map was provided.	<input type="checkbox"/> Outcomes are specific, measurable, student-centered, program-level outcomes. <input type="checkbox"/> Outcomes at least indirectly support Foundational Studies Learning Outcomes or the Graduate Learning Goals. <input type="checkbox"/> The Curriculum Map identifies where/to what extent each outcome is addressed. <input type="checkbox"/> At least one outcome was assessed in this cycle.	<input checked="" type="checkbox"/> Outcomes are important, specific, measurable, student-centered program-level outcomes that span multiple learning domains. <input checked="" type="checkbox"/> Outcomes directly integrate with Foundational Studies Learning Outcomes or the Graduate Learning Goals. <input type="checkbox"/> Outcomes reflect the most important results of program completion (as established by an accreditor or other professional organization). <input type="checkbox"/> Learning outcomes are consistent across different modes of delivery (face-to-face and online.) <input type="checkbox"/> Outcomes are regularly reviewed (and revised, if necessary) by the faculty and other stakeholders. <input checked="" type="checkbox"/> The Curriculum Map identifies where/to what extent each outcome is addressed and offers evidence that students have sufficient opportunity to

				<p>master the associated learning outcomes.</p> <p><input checked="" type="checkbox"/> Two or more outcomes were assessed in this cycle.</p>
<p>2. Measures & Performance Goals</p>	<p><input type="checkbox"/> No measures are provided.</p> <p><input type="checkbox"/> No goals for student performance are identified.</p>	<p><input type="checkbox"/> Measures are provided, but some are vague and/or do not clearly assess the associated outcomes.</p> <p><input type="checkbox"/> Measures are primarily indirect.</p> <p><input type="checkbox"/> Performance goals are identified, but they are unclear or inappropriate.</p> <p><input type="checkbox"/> Some performance goals are based on course and/or assignment grades, but there is no evidence that grades are calibrated to the outcomes.</p>	<p><input type="checkbox"/> At least one direct measure was provided for each outcome.</p> <p><input checked="" type="checkbox"/> Some information is provided to suggest that measures are appropriate to the outcomes being assessed.</p> <p><input checked="" type="checkbox"/> Clear and appropriate standards for performance are identified.</p> <p><input type="checkbox"/> Some performance goals are based on course and/or assignment grades, and general information is provided to demonstrate that grades are calibrated to the outcomes.</p> <p><input type="checkbox"/> Mechanisms used to assess student performance (rubrics, checklists, exam keys, etc.) were provided.</p>	<p><input checked="" type="checkbox"/> Multiple measures were employed, and most are direct.</p> <p><input type="checkbox"/> Detailed information is provided to show that measures are appropriate to the outcomes being assessed.</p> <p><input type="checkbox"/> Measures assess some high impact practices (internships, capstone course projects, undergraduate research, etc.)</p> <p><input type="checkbox"/> If students are required to pass a certification or licensure exam to practice in the field, this was included as a measure.</p> <p><input type="checkbox"/> Some measures allow performance to be gauged over time, not just in a single course.</p> <p><input type="checkbox"/> If a measure is used to assess more than one outcome, a clear explanation is offered to substantiate that this is appropriate.</p> <p><input type="checkbox"/> Clear and appropriate standards for performance are identified and justified.</p> <p><input type="checkbox"/> Mechanisms used to assess student performance (rubrics,</p>

				<p>checklists, exam keys, etc.) were summarized as well as provided to demonstrate that the measure provides specific evidence of what students know/can do.</p> <p><input type="checkbox"/> If performance goals are based on course and/or assignment grades, specific evidence is provided to demonstrate that grades are calibrated to the outcomes.</p>
3. Results	<p><input type="checkbox"/> No data are being collected.</p> <p><input type="checkbox"/> No information is provided about the data collection process.</p> <p><input type="checkbox"/> No results are provided.</p> <p><input type="checkbox"/> Students are meeting few of the performance standards set for them.</p>	<p><input type="checkbox"/> Some data are being collected and analyzed.</p> <p><input type="checkbox"/> Some results are provided.</p> <p><input type="checkbox"/> Insufficient information is offered to demonstrate that data collection, analysis, and interpretation processes are valid.</p> <p><input type="checkbox"/> Students are achieving some of the performance standards expected of them.</p>	<p><input checked="" type="checkbox"/> Data are being collected and analyzed.</p> <p><input checked="" type="checkbox"/> Results are provided.</p> <p><input checked="" type="checkbox"/> Some information is offered to demonstrate that data collection, analysis, and interpretation processes are valid and meaningful.</p> <p><input checked="" type="checkbox"/> Students generally are achieving the performance standards expected of them.</p>	<p><input type="checkbox"/> Clear, specific, and complete details about data collection, analysis, and interpretation of results are provided to demonstrate the validity and usefulness of the assessment process.</p> <p><input type="checkbox"/> Students generally are achieving the performance standards expected of them and demonstrate continuous improvement on standards they have yet to achieve/achieve less well.</p> <p><input type="checkbox"/> If students are required to pass a certification or licensure exam to practice in the field, the pass rate meets the established benchmark.</p>
4. Engagement & Improvement	<p><input type="checkbox"/> No one is assigned responsibility for assessing individual measures.</p> <p><input type="checkbox"/> Assessment primarily is</p>	<p><input checked="" type="checkbox"/> The same faculty member is responsible for collecting and analyzing most/all assessment results.</p>	<p><input type="checkbox"/> Multiple faculty members are engaged in collecting and analyzing results.</p> <p><input checked="" type="checkbox"/> Results regularly are shared</p>	<p><input type="checkbox"/> All program faculty members are engaged in collecting and analyzing results.</p> <p><input type="checkbox"/> Faculty regularly and</p>

	<p>the responsibility of the program chair.</p> <p><input type="checkbox"/> No improvements (planned or actual) are identified.</p> <p><input type="checkbox"/> No reflection is offered about previous results or plans.</p>	<p><input type="checkbox"/> It is not clear that results are shared with the faculty as a whole on a regular basis.</p> <p><input type="checkbox"/> Plans for improvement are provided, but they are not specific and/or do not clearly connect to the results.</p> <p><input type="checkbox"/> Little reflection is offered about previous results or plans.</p>	<p>with the faculty.</p> <p><input checked="" type="checkbox"/> The faculty regularly engages in meaningful discussions about the results of assessment.</p> <p><input checked="" type="checkbox"/> These discussions lead to the development of specific, relevant plans for improvement.</p> <p><input checked="" type="checkbox"/> Improvements in student learning have occurred as the result of assessment.</p>	<p>specifically reflect on students' recent achievement of performance goals and implement plans to adjust activities, expectations, outcomes, etc. according to established timelines.</p> <p><input type="checkbox"/> Faculty and other important stakeholders reflect on the history and impact of previous plans, actions, and results, and participate in the development of recommendations for improvement.</p> <p><input type="checkbox"/> Continuous improvement in student learning occurs as the result of assessment.</p> <p><input type="checkbox"/> Outcomes and results are easily accessible to stakeholders on/from the program website.</p> <p><input checked="" type="checkbox"/> Assessment is integrated with teaching and learning.</p>
Overall Rating	<input type="checkbox"/> Level 0 – Undeveloped	<input checked="" type="checkbox"/> Level 1 - Developing	<input type="checkbox"/> Level 2 – Mature	<input type="checkbox"/> Level 3 – Exemplary

I recognize that the program's outcomes are included in the new, improved outcomes library (and linked to undergraduate learning goals), but they should be listed in this document as well so that I can easily determine that they link appropriately to the assessment measures. (They do, and they are specific and measurable now—thank you.) The program used three measures to assess seven outcomes, two direct and one indirect. Standards appear to be appropriate given actual results (and national results for the MFT), and students meet some of them. While only the program director is involved in collecting and analyzing assessment data, it is clear that the faculty as a whole regularly is engaged in conversations about student learning and in planning to improve performance.

Thank you for completing your 2017 Student Learning Summary Report!