Annual Program Assessment Report

Academic Year: 2017-2018

Department: Gianforte School of Computing

Assessment reports are to be submitted annually by program/s. The report deadline is September 15th .

The use of this template is optional, however, any assessment report submitted must contain the required information provided in template.

Program(s) Assessed:

Indicate all majors, minors, certificates and/or options that are included in this assessment:

Majors/Minors/Certificate	Options
B.S.	**Professional, Interdisciplinary**
Non-Teaching Minor	

Annual Assessment Process

1. Data are collected as defined by Assessment Plan
2. Population or unbiased samples of collected assignments are scored by at least two faculty members using scoring rubrics to ensure inter-rater reliability.
3. Areas where the acceptable performance threshold has not been met are highlighted.
4. The scores are presented at a program/unit faculty meeting for assessment.
5. The faculty reviews the assessment results, and responds accordingly.
    a. If an acceptable performance threshold **has not been met**, possible responses:
        - Gather additional data to verify or refute the result.
        - Identify potential curriculum changes to try to address the problem
        - Change the acceptable performance threshold, reassess
        - Choose a different assignment to assess the outcome
    b. If acceptable performance threshold **has been met**, possible responses:
        - Faculty may reconsider thresholds
        - Evaluate the rubric to assure outcomes meet student skill level (example – classes with differing learning outcomes based on student level)
        - Use Bloom's Taxonomy to consider stronger learning outcomes
        - Choose a different assignment to assess the outcome

6. **Demonstrate the impact of the assessment response in next assessment cycle.**
7. Submit Assessment reports annually to report assessment activities and results by program. The report deadline is September 15th.

1. What Was Done

a) What learning outcomes were reviewed? (Please include the description of the learning outcomes from assessment plan)

Each year, we evaluate our 11 program outcomes:

- Outcome A: an ability to apply knowledge of computing and mathematics appropriate to the discipline
- Outcome B: an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- Outcome C: an ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
- Outcome D: an ability to function effectively on teams to accomplish a common goal
- Outcome E: an understanding of professional, ethical, legal, security, and social issues and responsibilities
- Outcome F: an ability to communicate effectively with a range of audiences
- Outcome G: an ability to analyze the local and global impact of computing on individuals, organizations and society
- Outcome H: recognition of the need for, and an ability to engage in, continuing professional development
- Outcome I: an ability to use current techniques, skills, and tools necessary for computing practices
- Outcome J: an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices
- Outcome K: an ability to apply design and development principles in the construction of software systems of varying complexity

b) Include planning table – inform if there are changes to the assessment plan.

	How Often	**Inaugurated**	**Most Recent**	**Next**	**Next**
Graduating Senior Survey	Annually	April 2005	Spring 2018	Fall 2018	Spring 2019
Custom Test	Each semester	April 2009	Spring 2018	Spring 2019	Spring 2020
Portfolio	Annually	May 2009	Spring 2018	Spring 2019	Spring 2020

2. What Data Were Collected

a) What was collected to assess learning outcomes listed above? (If multiple programs/minors are included, please indicate if different criteria was used).

We collect three forms of assessment data each year: we administer a graduating senior survey via Survey Monkey, (2) we administer a 10-question custom exam to graduating seniors and (3) we collect the capstone portfolios for our capstone courses. Our professional option capstone course is CSCI 468, Compilers and our interdisciplinary option capstone is CSCI 482/483, Interdisciplinary Project Instruction and Project. A random sample of custom exams and capstone portfolios are assessed using rubrics that we created.

b) How were data collected?

The graduating senior survey is administered via SurveyMonkey. Students complete the survey anonymously as part of our Program Assessment course (CSCI 481). The custom exam is taken in person as part of our Program Assessment course (CSCI 481). The capstone portfolio is submitted as a requirement in our capstone courses: CSCI 468, Compilers, for our professional option and CSCI 483, Interdisciplinary Project, for our interdisciplinary option.

NOTE: Student names must not be included in data collection. Totals of successful completions, manner of assessment (publications, thesis/dissertation, or qualifying exam) may be presented in table format if they apply to learning outcomes.

3. Explain how Data Were Analyzed

a) Explain the assessment process. Who participated in the process, the nature of the rubric utilized (or other norming methods), and the threshold outcome desired.

The graduating senior survey responses were shared with all faculty and staff in advance of our annual retreat in August.

Brendan Mumey and John Paxton assessed the custom exams. To do so, they used a provided spreadsheet and grading rubric.

Hunter Lloyd and Binhai Zhu assessed the capstone portfolios for the interdisciplinary option and the professional option. To do so, they used a provided spreadsheet and grading rubric.

4. What Was Learned

a) Results:

The custom exam demonstrated a weakness in Outcome A (an ability to apply knowledge of computing and mathematics appropriate to the discipline). This weakness was also present in 2016 and 2017. With respect to Outcome A, students were not able to consistently demonstrate a deep understanding of the time complexity analysis of mergesort or quicksort.

Our **professional option portfolios** demonstrated no weaknesses.

To simplify the assessment of the **interdisciplinary option portfolios**, portions of the portfolios were scanned and uploaded to the web. Unfortunately, some of the hand-written materials did not scan well and some key parts were omitted from the scans. Based on the information provided, the following weaknesses were identified by the evaluators:

- **Indicator 3: Design pattern.** Identify one design pattern that was used in your capstone project and describe exactly where in the code it is located. Highlight the design pattern in yellow. Explain why you used the pattern and didn't just code directly.
- **Indicator 6: Design trade-offs.** Describe a design trade-off decision (e.g. execution time *vs.* space requirements or compile time) in your capstone project and justify the design decisions that you made.
- **Indicator 7: Software development life cycle model.** Describe the model that you used to develop your capstone project. How did this model help and/or hinder your team?

Note: these weaknesses resulted from the preparation technique and are not true weaknesses. This is the first time that we attempted to make the interdisciplinary option portfolios available online. To avoid this issue next year, students will submit their portfolios in electronic format.

b) Describe how results were communicated to the department and used to develop plans for improvement.

The results of the graduating senior surveys, custom exams and capstone portfolios were shared with all faculty and staff in advance of our annual retreat. At our annual retreat on August 17, 2018, we discussed these results and decided on actions – see section 5.

5. How We Responded

a) Based on assessment, are there any curricular plans for the following year? (Such as plans for measurable improvements, or realignment of learning outcomes).

To help our students better attain Outcome A on the custom exam, recurrence relations will have graded assignments in CSCI 232, CSCI 246 and CSCI 432 and time complexity will have graded assignments in CSCI 132, CSCI 232 and CSCI 432.

To make sure that interdisciplinary option portfolios are easier to grade, students will submit them as pdf files in the future. The pdf file will include explicit sections to address the seven indicators (program, teamwork, design pattern, technical writing, UML, design trade-offs, software development life cycle model). More information: https://www.cs.montana.edu/paxton/abet/portfolios/

b) When will the changes be next assessed?

The effectiveness of these changes will be next assessed at our annual retreat in August 2019.

6. Closing the Loop

a) Do any of the outcomes this year represent improvements based on assessment from previous years (show multi-year use of progress).

Although we have seen improvements in the past, we did not see improvements this year.

Submit report to programassessment@montana.edu