CLAS Deans' comments on
BS in Computer Science, Non-Accredited Program Report
<u>**Reviewer**</u>: **Michael Cornebise, Associate Dean**

Last report submitted by department: Fall 2020 (Initial Assessment Plan).

Comments:
The BS in Computer Science 4-year assessment plan utilizes data from three main sources including grades from multiple required courses including MAT 2442, MAT 2345, MAT 2550, MAT 3701, CSM 2670, CSM 3670, CSM 4880 and CSM 4970, along with lab grades in multiple courses. The plan also includes a qualitative internship evaluation for each student conducted by the site internship supervisor (the internship course serves as the program capstone experience). This is a great example of an external means to measure student preparedness. The program is developing a graduate survey instrument that they plan to administer at the end of the Fall 2022 semester which will help augment the program's assessment data. Assessment data are shared with the department at a faculty meeting each semester and have led to incremental curricular changes related to minor course and lab revisions. To offer a suggestion to improve program assessment, I urge the Computer Science faculty to consider methods other than course grades to assess key SLOs in their program, though perhaps the forthcoming graduate survey can be deployed to provide supporting data.

Degree Program: Computer Science (B.S.)

Student Learning Outcome	ULG	Measures/Instruments	How Information is used
Students will demonstrate knowledge of core mathematical content	CT-4, 5, 6 QR-1, 2, 3, 4, 5, 6	Course grades from MAT 2442 – Calculus and Analytic Geometry II MAT 2345 – Discrete Mathematics MAT 2550 – Introduction to Linear Algebra MAT 3701 – Probability and Statistics I	The data are collected by the course faculty and the department chair. Course grade data are shared informally among course instructors and the department chair. Students who earn a "C" or lower

		MAT 2442- 2021-22 4 of 7 students met or exceeded expectations. MAT 2345 – 2021-22 5 of 9 students met or exceeded expectations MAT 2550- 2021-22 13 of 20 students met or exceeded expectations MAT 3701 – 2021-22 7 of 11 students met or exceeded expectations	typically are required to meet with their advisor to discuss potential issues and deficiencies that may be present moving forward.
Students will become proficient in programming in a high-level object-oriented language.	CT-3, 4 QR - 4	Course grades and individual labs from CSM 2670 – Object Oriented Programming Data from 2021-22 Reported are the number of students who met or exceeded expectations out of 25 total students. Lab 1: 20 Lab 2: 22 Lab 3: 17 Lab 4: 18 Lab 5: 16 Lab 6: 16	The data are collected by the course faculty and the department chair. Course grade data are shared informally among computer science faculty and the department chair. Students who earn a "C" or lower typically are required to meet with their advisor to discuss potential issues and deficiencies that may be present moving forward.

		Lab 7: 17 Lab 8: 16 Lab 9: 14 Lab 10: 13 Lab 11: 16	Labs are examined and discussed each summer prior to next course offering.
Students will understand the architecture, organization, and programming of modern computing systems.	CT-3, 4 QR - 4	Assessments and projects from CSM 3670 – Principles of Computer Systems CSM 4970 – Principles of Operating Systems CSM 3670: 2021-22 Assessment 1: 4 of 7 met or exceeded expectations Assessment 2: 2 of 7 met or exceeded expectations Assessment 3: 4 of 7 met or exceeded expectations CSM 4970: 2021-22 Project: 2 of 3 students met or exceeded expectations	The data are collected by the course faculty and the department chair. Course grade data are shared informally among computer science faculty and the department chair. Students who earn a "C" or lower typically are required to meet with their advisor to discuss potential issues and deficiencies that may be present moving forward. Labs are examined and discussed each summer prior to next course offering.
Students will learn the foundations of computer science, algorithm efficiency, and computational complexity	QR - 4	Assignments from CSM 4880 – Design and Analysis of Algorithms Data from 2021-22 One student in this data set has an incomplete in the course and	The data are collected by the course faculty and the department chair. Course grade data are shared informally among computer science faculty and the

		has several labs missing. They are not counted in this data set. Lab 1: 3 of 4 students met or exceeded expectations Lab 2: 3 of 3 students met or exceeded expectations Lab 3: 1 of 3 students met or exceeded expectations Lab 4: 1 of 3 students met or exceeded expectations Lab 5: 2 of 3 students met or exceeded expectations Lab 6: 2 of 3 students met or exceeded expectations Lab 7: 1 of 3 students met or exceeded expectations Lab 8: 2 of 3 students met or exceeded expectations	department chair. Students who earn a "C" or lower typically are required to meet with their advisor to discuss potential issues and deficiencies that may be present moving forward. Labs are examined and discussed each summer prior to next course offering.
Students will use current techniques, skills, and tools necessary for the practice of the discipline.	CT-3, 4 QR - 6	Completion of internship or similar applied experience (CSM 4275 – Internship in Computer Science). During the internship the student is evaluated by the site internship supervisor. In most cases there is a site visit or other regular communication between the student and the intern coordinator. The student must complete a report about the internship that details what work was done, how problems	Data are collected by the departmental internship coordinator. Data are shared informally among the computer science faculty.

		were overcome, and how the experience allowed him/her to apply what has been learned in the classroom to the field. 2021-22 All 6 students successfully completed the Internship. The supervisor ratings show the following- Ability and Knowledge: all 6 students rated as "excellent." Progress: 4 students rated as "excellent", 1 as "above average" and 1 "average." Compliance: all 6 students rated as "excellent." Responsibility: all 6 students rated as "excellent." Oral/written expression: all 6 students rated as "excellent" Preparation: all 6 students rated as "excellent." Cooperation: all 6 students rated as "excellent."	

Improvements and Changes Based on Assessment

1. Provide a short summary (1-2 paragraphs or bullets) of any curricular actions (revisions, additions, and so on) that were approved over the past four years as a result of reflecting on the student learning outcomes data. Are there any additional future changes, revisions, or interventions proposed or still pending?

Minor revisions to courses regarding labs and delivery of content have been made. Given the still relative newness of this degree option and the uncertainty present during the pandemic no additional changes have been made.

Looking ahead, CSM 3870- Data Structures is being considered as an assessment point because of its potential predictability of how well students will do in the remaining courses of the degree. The content of this course is also significant in its preparation for future coursework.

The graduating student survey instrument has been developed and will be implemented for the first time this coming semester. It is our hope that this instrument will provide additional supportive data for several of our student learning outcomes.

2. Please provide a brief description or bulleted list of any improvements observed/measured in student learning over the past four years. Be sure to mention any intervention made that has not yet resulted in student improvement (if applicable).

Grades in mathematics courses are less ideal than we would like them to be. That said, several (if not all) of the students who earned below a C in various math classes (many are the same students) have changed majors. We do believe the courses continue to provide a decent measure of the core mathematical knowledge needed to succeed in future courses. Discrete Mathematics (MAT 2345) and Linear Algebra (MAT 255) are of particular interest as both provide significant foundational material for later computer science courses. Probability and Statistics (MAT 3701) has as its prerequisite, MAT 2442 and so we should expect better performance from students in that class.

The data show that in CSM 4880 students were challenged by the complexity of the course and the work demands.

Looking at previous assessment reports, we also see that this is the first time that there have been this many labs (generally there are 5 labs). However, there was a need to create labs to cover some prerequisite material. This class also was populated primarily by transfer students who, ultimately, were not prepared for the coursework.

In a similar fashion, CSM 2670 had at least two students who never turned in any labs, along with various students believing they could skip one or more labs overall. This is a new attitude or "trend" that we will be watching.

The Internship continues to be an excellent capstone experience for our students. The experience also serves as a great external measure of how well we are preparing our graduates.

3. Using the form below, please document annual faculty and committee engagement with the assessment process (such as the review of outcomes data, revisions/updates to assessment plan, and reaffirmation of SLOs).

History of Annual Review		
Date of Annual Review	**Individuals/Groups who Reviewed Plan**	**Results of the Review (i.e., reference proposed changes from #1 above, revised SLOs, etc...)**
Fall 2021	Department Chair Computer Science Faculty Department as a whole at a department meeting	No changes recommended other than what was discussed above.
Spring 2022	Department Chair Computer Science Faculty Department as a whole at a department meeting	No changes recommended other than what was discussed above.

Dean Review & Feedback

November 22, 2022

Dean or designee   Date

Academic Affairs –Review & Feedback
B.S. Computer Science
The B.S. in Computer Science program utilizes course grades, various lab and course assignments, and an external internship evaluation to measure attainment of student learning outcomes. The broad range of instruments offers a chance to gauge performance across different course levels. The program will, however, want to identify whether the various lab and course assignments provide a grade or some other, more finely tuned, indication of meeting a student learning outcome. The program has wisely pinpointed CSM 3870: Data Structures as an indicator of future performance. As the SLO report notes, the recent development of more required labs (5) for the program, and the marked increase in absenteeism, need to be addressed.

3/8/23

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       VPAA Office   Dr. Suzie Park   Date