

**ASSESSMENT DATA REPORT**

**FOR**

**Computer Science, BS**

**(2020-2021)**

**I. DATA PRESENTATION AND REFLECTION**

The Department of Computer Science outcomes were evaluated using the Senior Capstone Project. The program analyzes eleven outcomes (a-k) adopted from the ABET learning outcomes for computer science (Table 1). All eleven outcomes were scored using a rubric as follows: Exemplary (5 points), Excellent (4 points), Good (3 points), Developing/Poor (2 points), and Unacceptable (1 point). Students are considered to be meeting learning outcomes if they score in either the Exemplary (5 points) or Excellent (4 points), or Good (3 points) category. The benchmark for satisfactory achievement of program goals of 80% of students reaching “Exemplary” or “Excellent”, “Good” status for the indicators was achieved. If the means were calculated, then any rubric indicator with a mean score of three or greater would be considered meeting standards for the program. Individual sub-indicators for the outcome were averaged to obtain the score reported.

**Table 1: COMPUTER SCIENCE PROGRAM OUTCOMES**

|  |  |
| --- | --- |
| Program Outcome | ABET Outcome |
| PO1: Identify and analyze computer-based systems, processes or components. Utilize their education to contribute critical and systemic thinking while recognizing ethical responsibilities. | (a) An ability to apply knowledge of computing and mathematics appropriate to the discipline  (i) An ability to use current techniques, skills, and tools necessary for computing practice. |
| PO2: Communicate and collaborate effectively when interacting with other individuals or serving on teams | (d) An ability to function effectively on teams to accomplish a common goal  (f) An ability to communicate effectively with a range of audiences |
| PO3: Evaluate and develop solutions in an organization by integrating computer science practices of programming and theory. | (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution  (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs  (g) An ability to analyze the local and global impact of computing on individuals, organizations, and society  (k) An ability to apply design and development principles in the construction of software systems of varying complexity. |
| PO4: Understand the importance of, and practice, continuing learning to keep abreast of developments in technology, economics, and society. | (h) Recognition of the need for and an ability to engage in continuing professional development  (e) An understanding of professional, ethical, legal, security and social issues and responsibilities  (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 1**

Identify and analyze computer-based systems, processes or components. Utilize their education to contribute critical and systemic thinking while recognizing ethical responsibilities.

**ASSESSMENT DATA FOR OUTCOME 1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **What data sources were used** | **When were data collected** | **Indicator** | **Percent of students earning good or exemplary** | **2020-2021** | **2019-2020 Mean (sd)** | **2018-2019 Mean** | **2017-2018**  **Mean** |
| CSC4990 capstone project | Spring 2020 | a | 81 | 3.85 (.75) | 3.2 (0.92) | 2.89 | 3.04 |
| CSC4500 project | Fall 2019 | i | 100 |  | 3.73 (0.45) | n/a | n/a |

1. **Identify STRENGTHS evident in the data.**

Students are meeting all benchmarks in all indicators for this objective.

1. **Identify OPPORTUNITIES for improvement of learning outcomes evident in the data.**

The data was collected during Covid when classes were mostly remote.

**OUTCOME 2**

Communicate and collaborate effectively when interacting with other individuals or serving on teams

**ASSESSMENT DATA FOR OUTCOME 2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **What data sources were used** | **When were data collected** | **Indicator** | **Percent of students earning good or exemplary** | **2020-2021** | **2019-2020 Mean (sd)** | **2018-2019 Mean** | **2017-2018**  **Mean** |
| CSC4990 capstone project | Spring 2021 | d) Effective Teams  d) Team Organization | 80%  80% | 3.5  3.0 | 3.4 (0.56)  3.4 (0.56) | 2.94 | 3.12 |
| CSC4990 capstone project | Spring 2021 | f) Pres. Delivery  f) Subject knowledge | 100%  80% | 3.7  3.7 | 3.5 (0.5)  3.4 (0.65) | 3.22 | 3.18 |

1. **Identify STRENGTHS evident in the data.**

Students are meeting all benchmarks in all indicators for this objective.

1. **Identify OPPORTUNITIES for improvement of learning outcomes evident in the data.**

There is not much difference between effective teams and their organization. This could be a good area to reduce assessment data. Teams had to gather remote during the entire time.

**Outcome 3**

Evaluate and develop solutions in an organization by integrating computer science practices of programming and theory.

**ASSESSMENT DATA FOR OUTCOME 3**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **What data sources were used** | **When were data collected** | **Indicator** | **Percent of students earning good or exemplary** | **2020-2021** | **2019-2020 Mean (sd)** | **2018-2019 Mean** | **2017-2018**  **Mean** |
| CSC4500 project | Fall 2019 | b) | 100 |  | 3.5 (0.51) | 3.22 | 3.14 |
| CSC4990 capstone project | Spring 2020 | c)design and implement  c) dem. comprehension | 48%  47% | 3.2 | 3.23 (1.36)  N/A | 3.11 | 3.23 |
| CSC4500 project | Fall 2019 | g) | 70 |  | 3.1 (0.86) | 2.94 | 3.04 |
| CSC4990 capstone project | Spring 2020 | k) | 100 |  | 3.6 (0.55) | 2.89 | 3.27 |

1. **Identify STRENGTHS evident in the data.**

Benchmarks are met for indicators (b) and (k) and are close to being met for indicator (g). The use of test questions for indicator (c) has exposed a weakness in that area.

1. **Identify OPPORTUNITIES for improvement of learning outcomes evident in the data.**

Assessment for indicator (k) should be redesigned to collect data in an individual rather than group basis. Serious time should be put into addressing the weakness in indicator (c). Need to continue to try to improve students analytic and design construction.

**OUTCOME 4**

Understand the importance of, and practice, continuing learning to keep abreast of developments in technology, economics, and society.

**ASSESSMENT DATA FOR OUTCOME 4**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **What data sources were used** | **When were data collected** | **Indicator** | **Percent of students earning good or exemplary** | **2019-2020 Mean (sd)** | **2018-2019 Mean** | **2017-2018**  **Mean** |
| CSC4990 capstone project | Spring 2020 | h) | N/A | N/A | 3.17 | 3.23 |
| CSC4990 capstone project | Spring 2020 | e) | 80 | 3.6 | 3.00 | 3.18 |
| CSC4500 project | Fall 2019 | j) | 100 | 3.73 (0.45) | 3.11 | 3.04 |

1. **Identify STRENGTHS evident in the data.**

All benchmarks have been met to indicators (e) and (j).

1. **Identify OPPORTUNITIES for improvement of learning outcomes evident in the data.**

Data was not collected for indicator (h). Assessment of this indicator should be built into the standard for this course. Need to improve upon metrics to indicate realities of students achieving their next goals.

**II. REFLECTION UPON INDIRECT SOURCES OF DATA CONCERNING STUDENT LEARNING**

**Provide summaries of and discuss any data collected concerning the program that constitute *indirect* measurement of learning outcomes - for instance, student focus groups or satisfaction/exit surveys; faculty focus groups or other qualitative observations; alumni surveys, advisory group input, etc. Discuss notable strengths and opportunities for improvement, suggested by these data.**

The program does not formally collect indirect measures of the learning outcomes. Annually we do sponsor a few events where Alumni return to campus. The alums who return report that they have been well prepared for professional practice by the AU CS program.

**III. EVIDENCE OF ACHIEVEMENT OF UNIVERSITY LEANING OUTCOMES**

Describe how data to establish evidence of University Leaning Outcomes were collected (e.g. which assignments, which classes, which semester(s)).

Students were evaluated on the following:

1. Writing samples were collected via a major paper on software engineering ethics. A draft was collected and graded and second draft scores are shown below
2. Speaking assessments were done during final project presentations for the Capstone CSC4900 course.
3. Critical thinking is data was gathered via a question on final exam for CSC3510. While the problem requires critical thinking to analyze and solve it, applying the rubric is an awkward fit. Students don’t need to explain their selections, they just need to properly analyze

**ASSESSMENT DATA FOR UNIVERSITY LEANING OUTCOMES**

|  |  |  |  |
| --- | --- | --- | --- |
| **CRITICAL THINKING** | **N (NUMBER OF STUDENTS TESTED)** | **AVERAGE RATING USING UNIVERSITY LEARNING OUTCOME RUBRICS, 2020-2021** | **PRIOR YEAR’S DATA**  **2020-2019** |
| EXPLANATION OF ISSUES | 21 | 3.2 | 4.8 |
| EVALUATING EVIDENCE, CONTEXT, AND ASSUMPTIONS | 21 | 3.7 | 4.4 |
| CONCLUSIONS AND RELATED OUTCOMES | 21 | 3.6 | 4.6 |
| **WRITING** |  |  |  |
| THESIS, FOCUS, SIGNIFICANCE | 21 | 5 | 5 |
| EVIDENCE, SUPPORT, ANALYSIS | 21 | 4.4 | 4.4 |
| COHESION, ORGANIZATION, FLOW | 21 | 4.6 | 4.6 |
| SYNTHESIS, INTEGRATION | 21 | 4.8 | 4.8 |
| LANGUAGE | 21 | 4.8 | 4.8 |
| **ORAL COMMUNICATION\*** |  |  |  |
| PHYSICAL ACTIONS | 21 | N/A | 4.4. |
| VOICE AND DELIVERY | 21 | 4.3 | 4.4. |
| LANGUAGE | 21 | 4.5 | 4.6 |
| ORGANIZATION AND TRANSITIONS | 21 | 4.7 | 5 |
|  |  |  |  |

\*Undergraduate Programs Only

**IV. EXECUTIVE SUMMARY REGARDING PROGRAM ASSESSMENT DATA**

The computer science program is graduating students who are well prepared in most areas. Assessment data indicates students are performing well in basic areas. They are proficient at using current technology to solve problems and are effective communicators and working in teams. The department needs to build and help students retain skills in higher level concepts like algorithm design which can take students to the next level in their careers.