

**Appendix A: TEMPLATE FOR ANNUAL PROGRAM REPORT REVIEW** (See preceding document for detailed descriptions for each section)

**ANNUAL PROGRAM REPORT**

College	College of Science
Department	Computer Science
Program	MS Computer Science
Reporting for Academic Year	2018-19
Last 5-Year Review	5/18/2018
Next 5-Year Review	5/18/2023
Department Chair	Dr. Levent Ertaul
Author of Review	Dr. Leann Christianson
Date Submitted	10/1/2019

I. **SUMMARY OF ASSESSMENT** (suggested length of 1-2 pages)

**A. Program Learning Outcomes (PLO)**

List all your PLO in this box. Indicate for each PLO its alignment with one or more institutional learning outcomes (ILO). For example: "PLO 1. Apply advanced computer science theory to computation problems (ILO 2 & 6)."

PLO1	Apply knowledge of mathematics and computational theory to analyze problems in computer science, and assess and determine the resources and requirements needed for their solution.	ILO1: Thinking & Reasoning; ILO2: Communication
PLO2	Design, develop, and evaluate a computer-based system, process, component, or program to meet desired needs.	ILO1: Thinking & Reasoning; ILO4: Collaboration
PLO3	Classify and explain the mechanisms, components and architecture of computing systems.	ILO1: Thinking & Reasoning
PLO4	Employ current techniques, skills, and tools necessary for computing practice, and justify the need for continuing professional development.	ILO1: Thinking & Reasoning
PLO5	Discuss professional, ethical, legal, and security issues and responsibilities, and the impact of computing on individuals, organizations and society.	ILO1: Thinking & Reasoning; ILO2: Communication
PLO6	Function successfully on teams to accomplish a common goal, and explain computer science concepts effectively in written and oral form.	ILO1: Thinking & Reasoning; ILO2: Communication; ILO5: Sustainability

## **B. Program Learning Outcome(S) Assessed**

*List the PLO(s) assessed. Provide a brief background on your program's history of assessing the PLO(s) (e.g., annually, first time, part of other assessments, etc.)*

Our department has been assessing PLOs in both the undergraduate and graduate program regularly. For semester conversion, it was decided that assessments would take place in the five required courses only. We will not be assessing elective courses. The five required courses include: CS 601 Advanced Algorithms, CS 611 Theory of Computation, CS 621 Operating Systems Design, CS 651 Web Systems, and CS 671 Cybersecurity.

Results gathered in the academic 2018-2020 year are for three of these five courses: (CS 601, 611, and 671). We were unable to obtain results for CS 621 and 651 due to sections of those courses being led by lecturers who were not indicated regarding the assessment process in a timely manner. It is our intention to have results from all five courses in this coming year

PLOs assessed include:

CS 601 Advanced Algorithms, PLO4

CS 611 Theory of Computation, PLO1

CS 671 Cybersecurity, PLO6, ILO Written communication

Department faculty develop a standard summative assessment to be given in each section of each assessed course, in addition to regular course materials specified by instructor. Initial summative assessment will be an exam with a proficiency requirement. Department faculty will also develop a grading rubric for the exam. A score of 60% proficiency will indicate that a student has met expectations for this PLO.

### **Summary of Assessment Process**

*Summarize your assessment process briefly using the following sub-headings.*

**Instrument(s):** *(include if new or old instrument, how developed, description of content)*

Department faculty developed a standard summative assessment for each course. The assessment is in the form of a multiple choice quiz to be given in each section of each assessed course. These quizzes are deployed through Blackboard during the last week of the course. Department faculty also developed a grading rubric for each assessment. A score of 60% proficiency was chosen to indicate that a student has met expectations for a particular PLO. Prior to semester conversion our department used a similar process; however, assessments were up to each individual instructor meaning multiple sections of the same course would have different assessments. This process was improved by having one standard assessment that all instructors can access thus allowing comparison between multiple sections of the same course.

### **Program Learning Outcomes:**

**Sampling Procedure:** Assessment exams are archived in Google drive and in a Blackboard Computer Science Assessment course. Faculty members retrieve the assessment for the course they are teaching and deploy it in their Blackboard course shell.

**Sample Characteristics:** Each assessment has 10 questions. Scores range from 0 - 100.

**Data Collection:** Each professor is responsible for gathering the assessment results and uploading the results to a shared Department assessment drive

**Data Analysis:** The assessment coordinator evaluates the assessment results and shares them with the graduate committee for curricular changes, areas of concern, and general comments.

### **Summary of Assessment Results**

*Summarize your assessment results briefly using the following sub-headings.*

In CS 601 Advanced Algorithms, PLO4 scores on the assessment were in the 90<sup>th</sup> percentile with one outlier scoring in the 60<sup>th</sup> percentile.

We found similar results in CS 611 Theory of computation, PLO1. The vast majority scored in the 90<sup>th</sup> percentile with one outlier in the 50<sup>th</sup> percentile

In CS 671 Cybersecurity PLO5 the average score was 96% with the lowest score being 80%.

### **Main Findings:**

One of the main changes in our curriculum for semester conversion was to require the course, CS 601 Advanced Algorithms. We added this course to the required list of courses for the degree because faculty noted that some graduate students needed to improve their programming skills and algorithmic knowledge to support success in graduate courses requiring advanced programming. From the results of the assessment of CS 601, PLO4 is being met, and students are obtaining the skills and knowledge of tools to support their advanced studies. We also find that PLO1 is also being met by CS 611 Theory of computation as scores indicate mastery of the material. Results for PLO 5 in CS 671 are excellent. The

department is pleased with the results of these assessments, and we do not have plan to change curriculum or prerequisites for these courses at this time.

### ILO Assessment - Written Communication CS 671 Cybersecurity

**Sampling Procedure:** The University's written communication rubric was used to score 4 different students enrolled in CS 671. Please see rubric below:

	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Statement of purpose, thesis or controlling idea(s)</b>	Clearly states a central idea, appropriate to the assignment.	Adequately states a central idea, generally appropriate to the assignment.	Inconsistently or superficially states a central idea, minimally appropriate to the assignment.	Lacks statement of a central idea, or states central idea inappropriate to the assignment.
<b>Audience awareness</b>	Demonstrates clear understanding of audience, appropriate to the assignment.	Demonstrates adequate understanding of audience, generally appropriate to the assignment.	Demonstrates inconsistent or superficial understanding of audience, minimally appropriate to the assignment.	Lacks an understanding of audience.
<b>Organization, cohesion, and clarity</b>	Clearly structured around the central idea. Uses a range of transitions to connect ideas, and is easy to follow.	Adequately structured around the central idea. Uses some transitions to connect ideas, and is follow.	Has minimal structure around the central idea. Uses few transitions to connect ideas, and is somewhat difficult to follow.	Lacks structure around the central idea. Lacks transitions that difficult to follow.
<b>Presentation of supporting ideas</b>	Presents evidence and ideas that clearly support and develop the central idea.	Presents evidence and ideas that generally support and develop the central	Presents evidence and ideas that minimally support and develop the central idea.	Does not present evidence or ideas that support or

		idea.		idea.
<b>Language usage, sentence structure</b>	Uses sophisticated and varied sentence structures. Demonstrates appropriate language choices.	Uses some variation in sentence structure. Generally demonstrates appropriate language choices.	Uses little variation in sentence structure. Minimally demonstrates appropriate language choices.	Lacks variation in sentence structure. Does not demonstrate appropriate language choices.
<b>Mechanics: grammar, punctuation, and spelling</b>	Shows correct use of grammar, spelling, and punctuation.	Shows mostly correct use of grammar, spelling, and punctuation. May have occasional errors that do not interfere with meaning.	Contains grammar, spelling, and punctuation errors that are distracting or occasionally interfere with meaning.	Contains grammar, spelling, and punctuation errors that are highly distracting or often interfere with meaning.

**Sample Characteristics:** scores 1-4 based in each category of the rubric

**Data Collection:** Four students were randomly selected by the instructor of the course

**Data Analysis:** The assessment coordinator reports the assessment results to the graduate Computer Science committee for curricular changes, areas of concern, and general comments.

**Average score:** 18/24

Students tended to score well with statement of purpose and audience awareness. Student’s weakest areas were in language usage and mechanics. As nearly all students in our graduate program are not native English speakers, this is not surprising. We have implemented procedures to have students take the WST within the first semester of enrollment so that they can enroll in a second tier English course as needed early on in their graduate career.

**Recommendations for Program Improvement:** *(changes in course content, course sequence, student advising)*

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**Next Step(s) for Closing the Loop:** *(recommendations to address findings, how & when)*

We will continue to monitor results of these assessments and will ensure that faculty and lecturers are informed in a timely manner regarding the assessment process.

**Other Reflections:**

The department faculty found the process of semester conversion useful in evaluating and addressing both student and curricular needs. It also allowed us an opportunity to stream line and standardize our assessment process.

**Assessment Plans for Next Year**

*Summarize your assessment plans for the next year, including the PLO(s) you plan to assess, any revisions to the program assessment plan presented in your last five-year plan self-study, and any other relevant information.*

For academic year 2019-20, we will assess PLO 2 Design, develop, and evaluate a computer-based system, process, component, or program to meet desired needs. This will be done in CS 651 Web Systems.

We will also be assessing the ILO Quantitative Reasoning in CS 651 Web Systems.