**UNIT REPORT Computing Science BS - Assessment Plan Summary** 

# **Computing Science BS**

# Ethical Principles, Technical Skills, And Management Skills (core)

### **Goal Description:**

To develop students' knowledge of ethical principles, technical skills, and management skills relevant to the field of computer science.

**RELATED ITEMS/ELEMENTS -**

### **RELATED ITEM LEVEL 1**

# Acquisition Of Technical Skill, Management And Ethical Principles Learning Objective Description:

Students will develop and demonstrate knowledge of ethical principles, technical skills, and management skills relevant to the field of computer science.

#### **RELATED ITEM LEVEL 2**

## **Capstone Project, Ethics Question, And TASO Indicator Description:**

All undergraduate CS students must complete COSC 4319 (Software Engineering) and COSC4349 (Professionalism and Ethics) prior to graduation. In addition, COSC4319, as a capstone course, covers the eight Student Outcomes (except the three outcomes (e), (g) and (h)) out of the eleven Student Outcomes and COSC4349 addresses the remaining three outcomes. Therefore, both the courses are selected for assessment. Additionally, TASO (Test for Assessing Student Outcomes) is implemented to quantitatively measure the eleven SOs. It is required for senior students to take it in senior-level Software Engineering course, prior to graduation regardless of their program concentration.

Attached Files TASO-assessment CS S17 <u>comparison from spring2012 to spring2017</u>

### **Criterion Description:**

To perform a quantitative assessment, the following rubrics for the two courses are developed: (1) rubric for Project, (2) rubric for presentation evaluation, (3) rubric for group member evaluation, and (4) rubric for ethics topics. For COSC4319, faculty members observe students' project presentation and directly evaluate students' performance based upon the rubrics (1)-(3). One the other hand, for COSC4349, students' performance is indirectly evaluated through the exam questions that address rubric (4). Each category is rated with the following scale values: (1) 1.0 (below expectations or unacceptable), (2) 2.0 (evolving or developing), (3) proficient (or competent), and (4) outstanding (or exemplary). Student's performance on Student Outcomes is directly evaluated with each specific rubric, while the performance on objectives is indirectly measured by mapping between Student Outcomes and Program Objectives.

Questions on TASO are based on topics from a number of required core courses (including COSC 1436, 1437, 2329, 3318, 3319, 4318, 4319, and 4349). Currently, it contains 26 multiple choice questions and 1 short answer question. Each multiple choice question has five choices, including the last choice of "I don't know". The percentage of students who select the correct answer to each given question will be computed and evaluated.

### **Findings Description:**

Figure 1 shows this year's assessment results for the 1st and 2nd component compare to prior years, and Figure 2 shows the assessment result for the 3rd component:

Figure 1. Student outcomes assessment (Fall 2016 – Spring 2017)

Figure 1. Student outcomes assessment (Fall 2016 – Spring 2017)

Spring 2017 results are improved from Fall 2016, and close to Fall 2014 based on the assessment score. The ABET committee noticed the score drop when we analyzed the Fall 2016 results, after talking to professors who taught these major courses, we identified the following issues:

- 1. It seems our student quality starts to drop, this is reflected in not only one, but a few major core courses. We have the same professor, using the same difficulty level course material, but the class fail rate increased.
- 2. The 1st component includes faculty evaluations, different faculty has different opinions about what is a good class project. Although we use the same project rubric, the subjective judgment affects the evaluation results.

In addition, from last year's TASO exam results, we noticed there are a few questions below the expected correct rate, especially the questions related to data structure courses (COSC 1436, COSC 1437, and COSC 3319). In Fall 2016, the department UCC committee reviewed the teaching materials of these three courses. Based on the ACM "Curriculum Guidelines for Undergraduate Degree Programs in Computer Science", we investigated whether these three courses have a full coverage of the required Knowledge Area, Knowledge Unit, and topics. We also built a concept map between these three courses, to make sure there are no gap, and not too much overlaps. We also changed some questions in TASO exam to better reflect course contents. As shown in Figure 2, Fall 2016 and Spring 2017 score are improved from Spring 2016 on the modified questions. There are still some questions below the blue line (expected correct rate). If these continue to be low, we will look at those questions with corresponding course instructors. Furthermore, we posted student presentation videos online, so more faculties can participate in the evaluation, and starting from Fall 2017, we will have three fixed faculty members for the Software Engineering class project evaluation to reduce subjectivity.

There are a few noticeable improvements from the changes we made last year:

- 1. The maximum TASO exam score increased from 73.1/100 to 92.3/100, and the median exam score increased from 55.8/100 to 61.5/100, due to the modification of data structure related questions;
- 2. After reviewing the contents of three data structure courses, we have a clear concept map of which course should cover what topics, not repeating too much contents, and no topics are left untaught;
- 3. We developed and added ABET assessment component to the newly established CSET degree program, and getting one step further to its ABET accreditation;
- 4. The newly joint faculty members have better understanding about the ABET assessment process through trainings/meetings;

### **RELATED ITEM LEVEL 3**

### COSC 1436/1437 Sequence

### **Action Description:**

The department has reviewed the content sequencing for the COSC 1436/1437 sequence and made adjustments. The department will monitor the efficacy of those adjustments.

### **RELATED ITEM LEVEL 3**

### TASO

### **Action Description:**

There is concern that a misalignment exists between the objectives of the TASO and the objectives of the Software Engineering course in which the TASO is conducted. There is also concern that the TASO does not adequately reflect performance for students in the Computer Software Engineering program. The Undergraduate Curriculum Committee will examine alternative approaches to conducting TASO.

**RELATED ITEM LEVEL 1** 

### TASO

### **Performance Objective Description:**

Each of the components of TASO provides aggregate results on a five point scale for each of the 11 Performance Objectives (PO) and Four Student Learning Objects (SLO) identified as appropriate measurements by ABET/CAC.

For each of the PO's and SLO's an aggregate score above 3.0 represents adequate performance. Aggregate scores above 4.0 represent strong performance.

# **Specialized Competencies**

# **Goal Description:**

To develop students' skills and knowledge in their concentration areas. The department offers three concentration areas: Computer Science, Information Systems, and Information Assurance.

RELATED ITEMS/ELEMENTS -----

#### **RELATED ITEM LEVEL 1**

### **Specialized Skills**

## Learning Objective Description:

Students will develop and demonstrate skills and knowledge in their concentration areas. The department offers three concentration areas: Computer Science, Information Systems, and Information Assurance.

**RELATED ITEM LEVEL 2** 

**Faculty Review** 

### **Indicator Description:**

During department meetings faculty with expertise in the three concentration areas will discuss students' performances in their concentration areas. We expect that faculty in each concentration area will evaluate the students' performances across the 18 hours course sequence for each concentration.

### **Criterion Description:**

In last year's review the faculty assessed more than 70% of the students were performing at or above expected levels. As a result, the faculty set a higher expectation. We expect that the faculty will deem at least 72% or more of students' performances as acceptable.

### **RELATED ITEM LEVEL 1**

# TASO

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# Update to Previous Cycle's Plan for Continuous Improvement

# Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

The Curriculum Committee has expressed some concerns over content coverage in COSC 1436/1437/3319. This should be reviewed in the upcoming cycle.

The Curriculum Committee is concerned about aligning assessment between Computing Science and Software Engineering Technology. This also should be reviewed, with recommendations for implementation in the next cycle.

# Update of Progress to the Previous Cycle's PCI:

A review of content in CS1436/1437 was conducted during summer 2017 resulting in a redivision of content across the two courses, with:

- Object Oriented Programming
- User Interfaces
- command line compilation

being moved from 1437 to 1436, and

• working with Unix-based systems added to 1437.

Alignment of assessment practices is under review by the Undergraduate Curriculum Committee.

# **Plan for Continuous Improvement**

# **Closing Summary:**

- Performance in the newly revised COSC 1436/1437 sequence will be monitored
- Alignment of assessment practices between Computing Science and Computer Software Engineering technology will be reviewed.