

William Paterson University
College of Science and Health - Department of Computer Science
Analysis of the Program's Student Outcome Assessment Data
Fall 2015 – Spring 2017 Assessment Cycle

Curriculum Committee Subgroup: Computer Organization

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Objective: S10: Demonstrate competence in computer organization.

ABET's Related Student Outcomes: (c), (i).

A. Analysis of the Assessment Data

For the assessment period Spring 2016 to Spring 2017, this student outcome was assessed in the courses CS2800 and CS3410.

In CS2800, we observe the lower tail-end category “Some Ability” over three semesters is: 4%, 22%, 5%, “Adequate Ability” is 17%, 13% 32%. The next category above that one is consistently the maximal population case over all semesters (42%, 22%, 9%), though often tied as such. In the “High Ability” tail, we observe 25%, 4%, 45% ; the F16 semester is the lowest.

Most students with low grade have weak background of Mathematics even someone’s GPA are not very low. From final exam I notice that many students’ ability of programming and tracing program at assembly level is low. One of the reasons is that they just satisfied the correctness of the final results of their programs and did not analyze the intermediate results and connect to their knowledge from lectures. I will adjust the schedule of lab projects and lectures in S17 semester and modify the requirements of lab projects.

In CS3410, notable “Some Ability” over three semesters is: 14%, 0%, 0%. “Adequate Ability” is 24%, 30% 33%. The next category above that one is consistently the maximal population case over all semesters (43%, 55%, 24%), though often tied as such. In the “High Ability” tail, we observe 14%, 10%, 14%. The S17 semester is the lowest which is consistent with CS2800 F16, most CS3410 S17 students took CS2800 in F16.

The performance of this semester is the worst in recent years, the percentage of “High Ability” is 14% only. Some students have weak back ground, the average GPA and CS2800 (prerequisite of CS3410) of whole class are 2.581, and 2.24 respectively. One student must retake this course. Most students have weak mathematic background. One question in final exam is the calculation of memory address bits from the given memory size, which is a simple logarithmic relationship; however more than 60 % students have wrong answers.

C. Suggestions for Improvement

In CS2800, to address the Adequate Ability case's situation, more practice/hands-on sessions may provide improvement. These students may need more exercises for homework and hands-on in class to make them more capable. In the homework students will be required to write code at assembly level and trace it, then implement and execute assembly code in lab projects. One more important thing is the integration of theoretical knowledge and practice/hands-on, More emphasize will be given on the studying the experiment results, in the tracing instruction sequence students must think the changes and their reasons of the computer states.

In CS 3410, considering to ask students to use VHDL to implement their project partially in LogicWorks to give them to learn the real design procedure in today’s industry.

D. Improvement Implemented

In CS2800 basic concepts of computer architecture, modern Intel x86, Main frames, and embedded processors were introduced in terms of additional lectures.

B. List all the “performance level/frequency/percentage” tables and their sources.

a. Faculty Course Assessment Report: CS2800, Spring 2016

Data Collected: Each student’s level of performance on homework assignments, two tests, final exam and a digital logic design project.

Method of Collection: There were six homework (15%), five lab projects (15%), one test (40%) and final exam (30%). All homework and lab projects are allowed to redo for correcting mistakes.

Performance Levels	Frequency	Percentage
No Ability	3	13%
Some Ability	1	4 %
Adequate Ability	4	17%
More than Adequate Ability	10	42 %
High Ability	6	25%

Observations:

- 1) Lectures of introduction of computer architecture, embedded systems and IBM mainframe were delivered by the end of semester.
 - 2) The students in this semester have stronger background, their average GPA is 3.028 and average score of CS2300 is 3.255; I try to use these two metrics to measure their background. Most students work hard. However some students with “No Ability” and “Adequate Ability” miss many homework and lab projects, and have low scores in final exam. One of them misses final exam and fails this course.
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b. Faculty Course Assessment Report : CS2800, Fall 2016

Data Collected: Each student’s level of performance on homework assignments, two tests, final exam and a digital logic design project.

Method of Collection: There were six homework (15%), five lab projects (15%), one test (40%) and final exam (30%). All homework and lab projects are allowed to redo for correcting mistakes

Performance Levels	Frequency	Percentage
No Ability	9	39 %
Some Ability	5	22 %
Adequate Ability	3	13 %
More than Adequate Ability	5	22 %
High Ability	1	4 %

Observations:

- 1) This semester is the worst one in past 20 years. Six students failed, within them, three didn’t take final exam, one got “0”, another two got “3 of 100” and “1 of 100”. All of those six students

didn't submit most homework and lab projects. The average final exam and total average are 45 and 59 respectively which are much lower than that of S16 semester, 63 and 75 respectively.

- 2) Three of those 3 students have received "early alert", however they still missed many homework and all lab projects. I am doubt the effeteness of "early alert".
- 3) Most students with low grade have weak background of Mathematics even someone's' GPA are not very low.
- 4) From final exam I notice that many students' ability of programming and tracing program at assembly level is low. One of the reasons is that they just satisfied the correctness of the final results of their programs and did not analyze the intermediate results and connect to their knowledge from lectures. I will adjust the schedule of lab projects and lectures in S17 semester and modify the requirements of lab projects.

c. Faculty Course Assessment Report: CS2800, Spring 2017

Data Collected: Each student's level of performance on homework assignments, two tests, final exam and a digital logic design project.

Method of Collection: There were six homework (15%), five lab projects (15%), one test (40%) and final exam (30%). All homework and lab projects are allowed to redo for correcting mistakes

Performance Levels	Frequency	Percentage
No Ability	2	9%
Some Ability	1	5%
Adequate Ability	7	32%
More than Adequate Ability	2	9%
High Ability	10	45%

Observations:

- 1) Many students with "High Ability" whose percentage is larger than previous semesters however many students with "Adequate Ability". Two students misses many classes and they must retake.
- 2) Lectures of introduction of computer architecture, embedded systems and IBM mainframe were delivered by the end of semester.

d. Faculty Course Assessment Report: CS3410, Spring 2016

Data Collected: Each student's level of performance on homework assignments, two tests, final exam and a digital logic design project.

Method of Collection: Each student is given a score on the homework (20%), tests (40%), design project (20%), and the final exam (20%).

Performance Levels	Frequency	Percentage
No Ability	1	5%
Some Ability	3	14 %
Adequate Ability	5	24%
More than Adequate Ability	9	43%
High Ability	3	14%

Observations:

- 1) The performance of this semester is the worst in recent years, the percentage of "High Ability" is 14% only which is 41% in F15. Some students have weak back ground, the average GPA, CS2600, and CS2800 (two prerequisites of CS3410) of whole class are 2.77, 2.46, and 2.67 respectively, which are 2.86, 3.11, and 2.92 respectively in F15. Four students must retake this course.
- 2) As a three-credit course, nearly the entire semester was spent on Boolean algebra, Boolean function minimization, combinational and sequential circuit design. As a result, there was little time to learn computer organization.

e. Faculty Course Assessment Report : CS3410, Fall 2016

Data Collected: Each student's level of performance on homework assignments, two tests, final exam and a digital logic design project.

Method of Collection: Each student is given a score on the homework, tests, design project, and the final exam.

Performance Levels	Frequency	Percentage
No Ability	1	5%
Some Ability	0	0%
Adequate Ability	6	30%
More than Adequate Ability	11	55%
High Ability	2	10%

Observations:

- 1) The performance of this semester is much better than S16 semester, the percentages of "High Ability" and "More than Adequate Ability" are 8% higher than that of S16. All students work hard and pass this course except one who quitted early without official withdraw.

2) From the final exam I noticed that the application of Multiplexer is the weakness of most students and this issue will be solved next semester.

f. Faculty Course Assessment Report: CS3410, Spring 2017

Data Collected: Each student's level of performance on homework assignments, two tests, final exam and a digital logic design project.

Method of Collection: Each student is given a score on the homework (20%), tests (40%), design project (20%), and the final exam (20%).

Performance Levels	Frequency	Percentage
No Ability	1	5 %
Some Ability	0	0 %
Adequate Ability	7	33 %
More than Adequate Ability	5	24 %
High Ability	3	14 %

Observations:

- 1) The performance of this semester is the worst in recent years, the percentage of "High Ability" is 14% only. Some students have weak back ground, the average GPA and CS2800 (prerequisite of CS3410) of whole class are 2.581, and 2.24 respectively. One student must retake this course.
- 2) Most students have weak mathematic background. One question in final exam is the calculation of memory address bits from the given memory size, which is a simple logarithmic relationship; however more than 60 % students have wrong answers