

Purdue University

Consolidation of Computer Engineering and Computer Science Programs

Financial Savings and Increased Revenue

February 22, 2011

1. About this document

This document illustrates the financial savings that would accrue if the two nearly parallel academic programs, namely, Computer Science and Computer Engineering, were either merged into a single academic unit or placed in the same college so as to significantly consolidate faculty and staff and coordinate teaching activities.

In summary, it is estimated that Purdue will save about \$3-4Million a year after the two programs have been consolidated. The consolidation will also increase revenue by an estimated \$1Million per year through enhanced Masters programs and new distance education programs. The savings and revenue are recurring.

2. Background

[*About the programs*]: Computer Science and Computer Engineering are managed in different colleges at Purdue University. The Computer Engineering program is a part of the School of Electrical and Computer Engineering and is located in the College of Engineering. While Computer Engineering is not a separate school or department, it is treated by the school's faculty as one of nine distinct areas of faculty interest. The Department of Computer Science, first in the United States, is located in the School of Science. Both programs offer BS, MS, and PhD degrees.

[*History of Consolidation*]: The issue of merger or co-location of Computer Science and Computer Engineering has cropped up on several occasions since 1996. However, in July 2008 this issue took a serious turn after the Head of Computer Science requested the Dean of Engineering to consider moving Computer Science to the College of Engineering with 16 full professors of Computer Science sending a letter to Provost Randy Woodson urging him to seriously consider moving Computer Science to the College of Engineering. A detailed log of events related to this issue is available elsewhere¹.

[*Other institutions and models*]: From a purely academic standpoint, the similarities suggest that CS and CE should work as a well-coordinated single entity. However, this is not the case at Purdue.

¹ [Moving CS to Engineering: An event log](http://www.cs.purdue.edu/homes/apm/RealignmentStatus.html)

[<http://www.cs.purdue.edu/homes/apm/RealignmentStatus.html>]

Top institutions in the United States, such as Berkeley, Michigan, Illinois, MIT, Princeton and Stanford, and nearly all of the rest of the world, consider and administer Computer Engineering and Computer Science as integrated programs from both administrative and academic perspectives. These institutions gain financial efficiencies while simultaneously offering greater opportunities to their students and faculty. Purdue, however, is unable to make such offerings or derive such efficiencies.

Despite the resultant benefits to the students, financial savings, and increased revenue, Purdue has not made any decision regarding this issue primarily due to non-academic concerns of the Dean of Science, the Head of ECE, and five senior professors in the Department of Computer Science.

3. Financial and Academic Considerations

At Purdue, a serious lack of academic oversight has led to a staggering overlap between the two programs at the level of courses, faculty interests, and day-to-day administrative activities. **In turn, this overlap has led to the following major disadvantages to the State of Indiana, to its students, and the Purdue student population at large.**

1. Financial waste to the tune of several million dollars since the mid-nineties due to uncoordinated faculty and staff hiring and assignment of teaching responsibilities.
2. Denial of outstanding opportunities to students who wish to learn Computer Science as engineers.
3. Inhibition of new synergies between Computer Science and all engineering disciplines.

4. Proposed Actions

The financial savings derived in this document are based on the following actions.

1. *Remove course duplication*
2. *Coordinate teaching assignments*
3. *Coordinate faculty hiring*
4. *Consolidate support staff:* Management of computing facilities is coordinated across Computer Science and Computer Engineering through specialized staff to provide the highest quality computing services to faculty and students. [Example: Facilities staff with expertise in managing hardware and software in support of classes and faculty research is shared between the two programs.]
5. *Increase student-faculty contact hours:* Lower level courses are taught either by regular faculty or only the provably outstanding continuing lecturers.

5. Savings

The savings derived here are based on fair projections of reduction in faculty and staff size during 2012-2017. Academic benefits that would accrue to the students of Purdue University due to a merger or co-location of the two programs are described elsewhere².

The following table lists recurring savings derived due to reduced need for teaching faculty, continuing lecturers, and support staff. Savings due to faculty retirements are not included in this derivation. **A total of at least \$3 Million in recurring funds will be saved during the first five years after the two programs have been consolidated;** and this saving will be derived without any degradation in academic offerings. **When likely retirements happen, the savings will be nearly \$3.75Million per year starting in Year 6.**

Consolidation of courses will increase course enrollments. Class sizes will be kept to a reasonable level by offering multiple sections. Doing so would not increase the need for Graduate Teaching Assistants (GTA).

Action	Savings: Personnel (P) Courses (C)	Comments
Remove course duplication	9 (C)	19 courses can be consolidated. However, due to increased enrollment, some courses will require increased number of sections.
Coordinate teaching assignments	5 (P)	Average course load per faculty member is 2 courses per year.
Coordinate faculty hiring ³ (a) Disciplinary (b) Interdisciplinary	(a) 3(P) (b) 2(P)	(a) Save one faculty position in each of the first three years leading to a total of three positions saved in Year 3 leading to recurring savings. (b) Save one faculty position each year leading to two positions saved leading to recurring savings.
Consolidate support staff	2 (P)	Save two positions in Year 1 leading to recurring savings

² [Why should the Department of Computer Science be in the College of Engineering?](http://www.cs.purdue.edu/homes/apm/TimeToMoveWhitepaper.pdf)
[<http://www.cs.purdue.edu/homes/apm/TimeToMoveWhitepaper.pdf>]

³ Assumption: Faculty hires over 5 years: 5 without coordination, 2 with coordination.

6. Increased Revenue

Many undergraduate freshman and graduate students are anxious to see the consolidation of Computer Science and Computer Engineering programs. They understand the benefits of such consolidation and wish that they had the opportunity to pick and choose courses from both programs. While theoretically they can do so in the current structure, uncoordinated class scheduling makes this nearly impossible. Consolidation of Computer Science and Computer Engineering programs will create an exciting environment at Purdue that would lead to increased revenue due to increased student intake and the creation of a vibrant distance education program.

[Increased student enrollment]: It is reasonable to expect that student intake will increase substantially were the two programs consolidated and new as well as enhanced degree programs offered to students across the College of Engineering while retaining the degree offered through the College of Science. The increase will also occur due to the rapidly rising demand of quality graduates in Computer Science and Computer Engineering, and especially those that have had a flavor of both programs in their curriculum. Such increased intake will lead to enhanced revenue at least for the two programs, and perhaps for Purdue. Based on data from the early part of the previous decade it is estimated that the net enrollments in the two programs would increase by at least 15% per year. This would lead to an additional 200 undergraduate students in the two programs resulting in substantial increase in revenue.

[Vibrant distance education program]: Purdue has an excellent distance education program in Engineering. It is offered through Engineering Professional Education. Given the heightened demand for distance education in Computer Science and Computer Engineering, it is estimated that consolidating these programs will result in about 100 students enrolled each year when the distance program stabilizes. Assuming that each student takes one course per semester at a cost of about \$3000 per course per student, this leads to net revenue of \$600,000 each year.

[Vibrant MS program]: Consolidation of the two programs will offer new opportunities for curriculum design that would be attractive to students desirous of a Master's degree. Given the combined faculty size of nearly 62 faculty members, it would be feasible to increase the size of the Master's program by 100. This would further add to Purdue's revenue stream.

<End of Document>