Flanders, Schmidt, and Rodriguez, LLC

MUSE-EI, SEB 240

School of Engineering

Mercer University

Macon, GA 31207

RE: RFP No MU-2013-01

April 25, 2013

Dr.

We submit herewith a proposal for repurposing the Keck Lab; the entire document is enclosed. It includes an introduction of the team, specifics of the technology that will be implemented, plans of proposed changes to the space, an explanation how the project will be managed and specifics of the project's budget. A tentative timeline of work has also been included.

If there are any questions and concerns regarding technical aspects, please direct them to Student At at 478-777-9311 ext. 1234. In regards to budgetary concerns, contact Student B at 478-777-9311 ext 5678. Lastly, all questions regarding the overall management of the project should be directed towards Student c at 478-777-9311 ext 9876.

We are thankful for your consideration for our proposal.

Sincerely,

Student A

enclosure: RFP No. MU-2013-01 proposal

Executive Summary: Repurposing the Keck Lab

The Mercer University School of Engineering has an unused lab in the engineering building called the Keck Lab. The reason for its abandonment is due to the fact that the computers in the lab are extremely out of date. However, Flanders, Schmidt and Rodriguez, LLC plan on reviving this room and making it a study room and computer lab for upperclassmen. This lab will have upgraded equipment, little to no class disturbances, and 24 hour Bear card access to Engineering students.

The members of our team are Student A, Student B and Student C. All are presently students of Mercer University. Student A is an information science and technology major. Students B and C are engineer majors with specializations in mechanical and industrial respectively. All team members have a tie to Mercer and a passion to make it better. The team members have worked on numerous projects with the Dr. Grady and university.

The start of the improvement to the Keck lab will start May 6th, 2013 and without any major delays, is planned to open the first day of school during the fall semester.

Proposal for Repurposing the Keck Lab

for

MUSE Engineering Improvements

Mercer University School of Engineering

Mercer University

Prepared by:

Students A, B, and C, LLC

Table of Contents

Table of Figures

Section 1: Introduction

1.1: Purpose and Background:

In this proposal, Students A, B, and C, LLC, will address the currently neglected Keck Lab in the Engineering Building of Mercer University. Today, Mercer University's School of Engineering provides two computer labs for its students. Both are located in the Engineering building and are Bear card accessible to all engineering students all day every day. As well as being a student lab, both labs are used as classrooms as well. This poses a problem when classes are in the labs and students are unable to work in them. Also, some upperclassmen often times need to use these labs for extended periods of time without being asked to leave due to a class entering the lab. Presently, the Keck Lab is an unused lab with currently no access to students and extremely out of date computers as shown in Figure 1.

Figure 1: Out of date computers make the Keck Lab useless

With all of its downfalls, the Keck Lab is rendered useless to all students and most faculty members and thus is a complete waste of space in the Engineering building. The Keck Lab could help solve the problem of students and professors who use the labs.

1.2: Credibility:

The members of our team consist of Students A, B, and C, who all are presently students of Mercer University. Student A is an information science and technology major and will be working primarily on optimizing the computing systems inside of the lab so that it is more contemporary and the technology is more up to date. Student B is a mechanical engineer major and will be chiefly in charge of layout of the room so that the lab can be used to its maximum efficiency yet there is ease of movement too. Student C is an industrial engineer major and will be mainly tasked with making sure that workstations space is optimized and will be overseeing the overall scope of the project. Being students, all team members have a tie to Mercer and a passion to make it better. The team members have worked on numerous projects with the Dr. Grady and university.

Introduction:

The main objective of Students A, B, and C, LLC, is to revive the Keck lab and make it totally functionally for the use of engineering students and the software they need to use. Also, some students will need access to high power systems for large projects such as senior design. Thus two high performance computers will be implemented and we will decrease the total number of systems from 24 to 15 and upgrade those systems. These implementations and installations will require the expertise of the MU computer engineering dept. Because of the installation of many high end components to the computer systems, MU school of engineering faculty/staff would be encouraged to lead the upgrades of the systems.

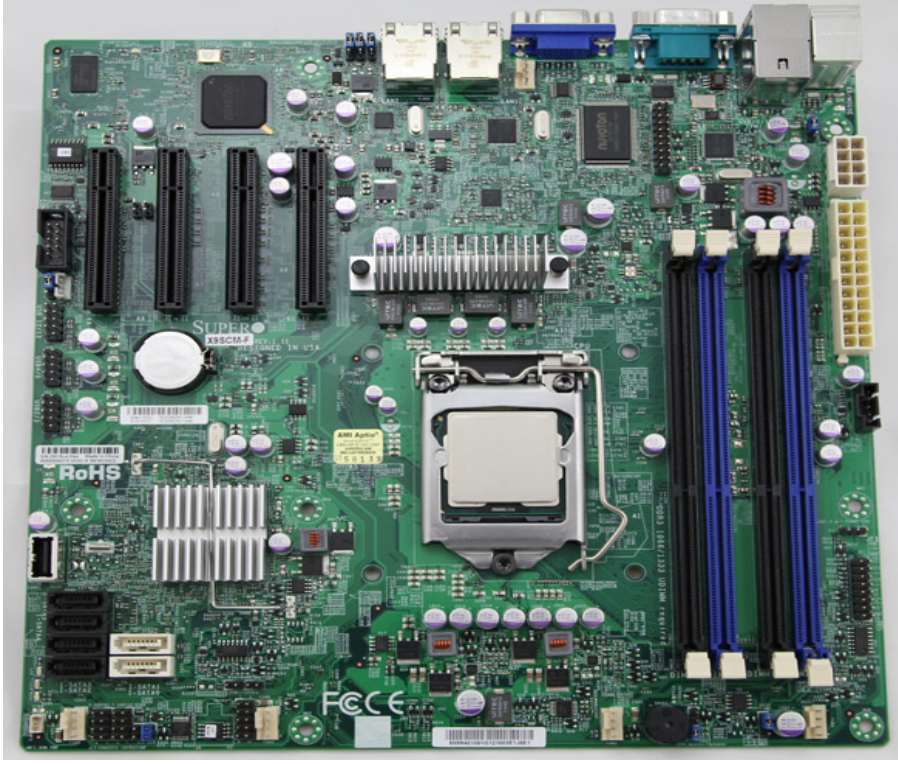
The layout of the Keck lab will need to be improved from the current layout. The long tables and circle tables will need to be moved to make optimal use of whiteboards and projector. A second whiteboard will be hung to provide more space for students to work. Also, a projector will be available for students to practice presentations. A printing station will also be accessible. The long tables will be slightly modified to have keyboard trays that in turn will allow for more space on top of the table.

Section 2: Technical Approach

Section 2.1: Technology Description

Beginning with the microprocessor, the UltraSPARC IIi in each of the systems will be replaced with Intel's Xeon E-3 1230 processor . While the UltraSPARC IIi consists of 2 cores and has a top clock speed of 480MHz, the Xeon E-3 1230 consists of 4 cores with a clock speed of 3.3GHz. The Xeon processor will add state of the art computing power to the systems that the UltraSPARC IIi cannot. The microprocessor will also sit on top of high performance X9SCM-F motherboards from SuperMicro that will provide a balance of performance, power consumption, and cost(fg 2.1.1).

Figure 2.1.1: The E3-1290 on top of Supermicro's X9SCM-F will provide serious computing power to engineering students



In regards to memory and graphics, 8 GB of RAM will be accessible in addition to the NVIDIA GeForce GTX 670 graphics card. The GTX 670(fg 2.1.2) has the ability to respond to the graphics workload of a system by changing the clock speed of its own processor. Having the memory, processing power, and capable video card will ensure that students have access to one

of the best computing experiences that they have ever had.

Students will also be provided with access to 2 state of the art, research capable systems by the addition of two high performance workstations. Beginning with the microprocessors, the systems will be outfitted with two Intel Xeon E5-2690 (fg 2.1.3) processors sitting on top of Asus's Z9PE dual motherboard.

Figure 2.1.3: w Xeon E5-2690 processors sit on a high performance motherboard for greater processing power

Although the E-3 has a higher clock speed, the E-5 supports a lot more RAM (32,768MB vs 768,000MB respectively). Even though the systems will boast 32GB of RAM, the processors would allow room for significant upgrades in regards to memory if needed. Lastly, the systems will be outfitted with GeForce GTX 680 4GB video cards. These systems can be used for projects that require extreme power for graphics use.

Section 2.2: Solution Feasibility

Making significant upgrades to all 24 systems along with creating 2 high performance systems would cost the school a significant amount of money. However, because the upgrades will allow for a better learning experience during projects, the upgrades need to happen. Seeing that the size of the room isn't conducive to the needs of students in regards to space with the present number of computers, decreasing the number of computers from 24 to 15 makes the high performance upgrades more feasible in that less money would be used to make upgrades (fig 2.2.4). Salvaging parts that are not upgraded will also allow parts such as RAM and other hardware such as keyboards, monitors, and other hardware to be reused. Although budget constraints will limit the

best possible outcome of making all systems high performance, or simply making minor upgrades to all systems, making a smaller number of systems usable along with two high performance systems would allow for an optimal balance of frugality and computing power.

Fig 2.2.4: With 24 computers, the current set up of the Keck Lab limits space. If the number of systems was decreased to 15 along with the addition of the two high

Section 2.3: Required equipment, facilities, and resources

Seeing that there will essentially be an overhaul of all computer systems in the Keck Lab along with the building of 2 high performance systems, the expertise of the Mercer University Computer Engineering department will be needed for installation and implementation. There will be many high end components that will have to be installed, and the participation of engineering faculty and staff is encouraged; this can also include computer engineering seniors. There will be no need for specialized equipment other than basic tools for computer component installation. A computer installation guide will possibly be needed along with some basic education of hardware installs if need be.

Building and configuring the high performance systems will have to done in a place other than the Keck Lab itself. The finished product of the high performance systems will take up a significant amount of space and may need to be built in an open space such as the networking lab inside of the Computer science department. The configuration of the lab includes open space along with access to the computer science department.

Section 3: Operations and Management

3.1 Layout

The layout of the room as of right now for the lab is as seen in the figure 3.1 below. The room is set up as a computer classroom with only two empty 3 and a half foot round tables. There is currently no keyboard tray on the desk either so there is not much room for books and other materials space. To provide more room for studying and to allow students to have somewhere to work out their own laptops or projects, we will reduce the number of computers in the room . This will then free up some of the tables to allow them to be used for other tasks.

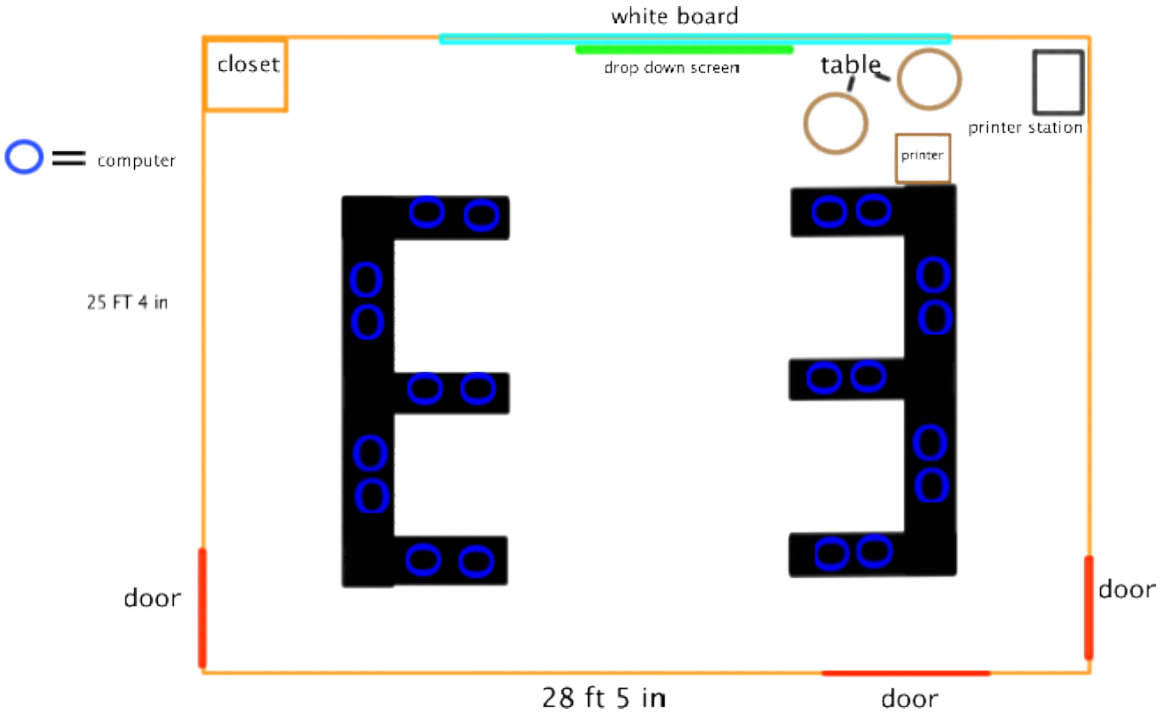


Figure 3.1: Current Layout

The purposed layout of the lab will require for the installation of 3 6 ft. white boards on the three walls with no whiteboards. This will allow students to work out problems or use the boards to share ideas among themselves during team projects. The two God Boxes would be place near the center of the room to make sure they have plenty of air circulation around them. The computers will all be placed to face the center of the room with the exception of the God Boxes that will be in the middle facing outward. Each table where a computer is found will be fitted with a keyboard tray under the table to free up space on the table. The two center tables that were in the middle will stay in the middle but be empty. The round tables will also be placed in the center of the room. The figure 3.2 below shows the proposed layout.

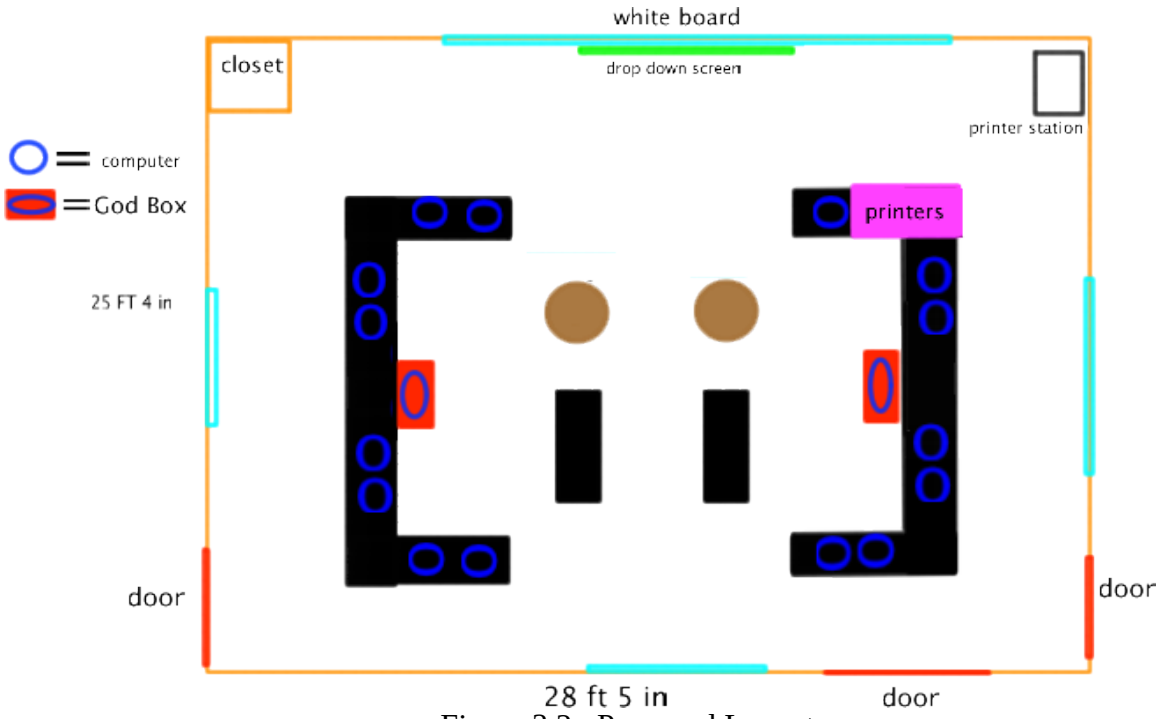


Figure 3.2 : Proposed Layout

3.2 Budget

Cost is an important factor to any project. It is our goal to maximize every dollar spent and get the best equipment possible. By focusing on quantity over quality , we plan to equip the Keck Lab with great equipment at an affordable cost . The following tables show all the cost that go into the two God Boxes and as well as the other computers. Along with the computers, we will also be purchasing three 6-foot dry erase white boards, along with keyboard trays . Table 1 is of the regular computers and the components that will be needed for it. Table 2 is for the God Boxes . Each table shows the price per unit.

Part	price	# needed	total
Intel Xeon E3-1230 V2 Ivy Bridge 3.3GHz (3.7GHz Turbo) LGA 1155 69W Quad-Core Server Processor BX80637E31230V2	$234.99	1	$234.99
SUPERMICRO MBD-X9SCM-F-O LGA 1155 Intel C204 Micro ATX Intel Xeon E3 Server Motherboard	$199.99	1	$199.99

Kingston 8GB (2 x 4GB) 240-Pin DDR3 SDRAM ECC Unbuffered DDR3 1333 (PC3 10600) Server Memory Model KVR1333D3E9SK2/8G	$89.99	4	$359.96
Two Thermalright Archon SB-E	$84.95	1	$84.95
NVIDIA GeForce GTX 670	$389.99	1	$389.99
		Total per unit	$1,269.88

Table 1 : Regular Computers

Part	price	# needed	total
ASUS Z9PE-D8 WS Dual LGA 2011 Intel C602 SATA 6Gb/s USB 3.0 SSI EEB Intel Motherboard	$579.99	1	$579.99
Intel Xeon E5-2690	$1,970.99	2	$3,941.98
Thermalright Archon SB-E	$84.95	2	$169.90
Kingston 8GB DDR3-1600 ECC Registered RAM	$89.99	4	$359.96
eVGA Geforce GTX 680 FTW+	$549.99	1	$549.99
Asus Xonar DSX	$43.99	1	$43.99
Adaptec 7805 kit	$583.84	1	$583.84
Intel 520 Series 480GB	$489.99	1	$489.99
Pioneer BDR-208	$99.99	1	$99.99
Asus DRW-24B1ST DVD-RW	$16.99	1	$16.99
Lian-Li PC-V2120X	$469.99	1	$469.99
Corsair AX1200i	$329.99	1	$329.99
APC Smart-UPS 1500VA	$603.99	1	$603.99
Three Scythe Gentle Typhoon 120mm	$16.95	3	$50.85
		Total per	$8,291.44

God Box

Table 2 : God Boxes

Since we are purchasing the computers parts it will be necessary to assemble the units ourselves. A rate of $11 per hour is the rate at which assembly and installation for the computers will be charged. The God Boxes will each require 10 hours per unit to assemble. The other computers will only require 3 hours . Again these costs will cover the assembly of the computers as well as the installation of them into the lab. The labor costs are shown in table 3 below.

hrs/unit	cost	# of units	Column1
10	$11.00	2	$220.00
3	$11.00	15	$495.00
		total	$715.00

Table 3 : Labor

Our total projected budget is shown in table 4 below. In it you will find all the cost to complete the Keck Lab renovation .If upon reviewing the table and more of a particular thing is seen to be needed, we will gladly make changes and present you with a new budget

	price	# needed	total
God Box	$8,291.44	2	$16,582.88
lab Box	$1,269.88	15	$19,048.20
keyboard tray	$38.60	17	$656.20
dry-erase board 6x4	$169.39	3	$508.17
clock	$19.97	1	$19.97
Labor total			$715.00
		Total for project	$37,530.42

Table 4 : Total Projected Budget

Appendix

	20-Mar	23-Mar	25-Mar	27-Mar	1-Apr	4-Apr	24-Apr	6-May	8-May	10-May	13-May	15-May
Attended bidders conference	x***x											
Chose scope of work	x***x											
chose team norms		x***x										
surveyed preliminary of lab			x***x									
inventory of typical box				x***x								
inventory of equipment				x***x								
create winning strategy				x***	***x							
took dimensions of lab				x***x								
talk with Mercer IT Department about hardware and software					x***	***x						
research					x***	***	***x					
finish proposal								x***x				
Redesign layout of lab					x***x							
installation of hardware									x***	***x		
installation of software										x***	***x	
installation of keyboard trays												x***x
Grant Bearcard access to lab to upper class												x***x
reconfiguration of room setup									x***	***	***	***x

Figure A: Proposed schedule of project

The Gantt chart above shows a basic outline of the important tasks that must be done and the order in which they are to be performed. As soon as approval is passed to go forward with the project, the first step would be to place the order for the parts needed. Removing any of the computers not needed would be the second step as well as removing anything from the lab that is not seen as important in there. Upon arrival of the hardware, Mercer's IT department should be notified so that they can start the installation of the hardware and then the software. Once the keyboard trays arrive, the tables can be placed in the purposed layout. The tables that will hold computers will then be equipped with a keyboard tray. Upon installing the computers in the lab and making sure everything is running as planned, Bearcard access to the lab can be granted to the upper class students you wish to allow the use of the lab.