FY05 Technology Fee Proposal

Submitting Organization: College of Arts and Sciences
   Major Unit: College of Arts and Sciences
   Department: Computer Science

Contact Person: Martin D. Fraser
   E-Mail: mfraser@cs.gsu.edu
   Telephone: 651-0657

Contact Person: Johannes Hattingh
   E-Mail: jhattingh@mathstat.gsu.edu
   Telephone: 651-0612

1. Project Short Title

   Replacement of COE-140 Classroom Computers

2. Total Requested

   Fiscal Year 2005
   $112,500

3. Executive Summary

   Project Description (three or four sentences)
   This proposal is for an upgrade to the computer equipment that supports courses in the departments of Computer Science, Mathematics and Statistics, Communications, and Art and Design. This equipment will replace the current workstations in room 140 COE. The current machines (two year old Dell computers) will be split between the departments of Computer Science and Mathematics and Statistics and will replace older machines.

4. Project Description

   This proposal is for an upgrade to the computer equipment that supports courses in the departments of Computer Science, Mathematics and Statistics, Communications, and Art and Design. This equipment will replace the current workstations in room 140 COE. The current machines will be split between the departments of Computer Science and Mathematics and Statistics and will replace older machines. Thus these computers have an effective lifetime of four years or more. In addition to the in-class time, the students use these machines extensively outside of class. These are high end machines that support high end computer graphics courses (as discussed in section 10). These courses are the only ones on campus that teach the graphics methodologies and software used in the Digital Aquarium.

5. Record the review numbers assigned by UCCS and Facilities. Their assessments must be included in Sections 16 and 17.

   UCCS: 05-041
   Facilities: 13259-04

6. Relevance to Regents Guidelines
This project directly supports Guidelines [1] (Technology fee revenues should be used primarily for the direct benefit of students to assist them in meeting the educational objectives of their academic programs,) and [3] (Technology fee revenues should be used for hardware and Network related expenditures that include support of general purpose or special purpose laboratories used by students for body productivity and more discipline related activities.)

7. Relevance to Strategic Plan(s)

A major strategic goal of the University, College, and Department is to provide a high quality undergraduate education. For the Computer Science department, this means that our students must have access to the proper equipment so that their education will be competitive with other top level schools. Having fast graphics computers such as these allows us to be competitive. It is also important for the students from Communications and Art and Design who take these courses.

8. Impact on Students Served

In section 10 we discuss the courses CSc/Film/GRD 4840/6840 and 4841/6841 (with a total of about 40 – 50 students per year) and CSc 4820/6820 and CSc 8820 with a total of about 30 – 40 students per year) and CSc 4620/6620 (with about 30 students per year). In addition to these the Department of Mathematics and Statistics uses COE 140 for special sections of several courses. These are scheduled based on the availability of the room and an instructor. These courses are as follows:

- Math 1111 College Algebra. Special sections use files developed to work with a mathematical oriented software package called StudyWorks. COE 140 accommodates 30 to 35 students in one of these sections. These students self select from a pool of over 2500 students who take Math 1111 per year. Math 1113 Precalculus. Special sections use files developed to work with WebCT. COE 140 accommodates 30 to 35 students in one of these sections. These students self select from a pool of over 1000 students who take Math 1113 per year.
- Math 2050 Informal Geometry, Math 4301/6301 Transformational Geometry, and Math 4371/6371 Modern Geometry. Special sections work with a software package called Geometer's Sketchpad. COE 140 accommodates 20 to 40 students in sections of these courses that are heavily populated by education majors.

COE 140 is open Monday-Thursday 8:30 AM to 9:30 PM and Friday 8:30 AM to 5:00 PM. Any of these times when there is not a scheduled class the room is open to students in any of the courses discussed below.
Provide a specific description of the funding requirements for FY 2005 in the Microsoft Excel spreadsheet below. Itemize and total the following categories of expense. If necessary, add lines to the table below corresponding to accounting objects of expense. Please note that any equipment items less than $4,999 should be categorized as “supplies.”

<table>
<thead>
<tr>
<th>Object of Expense</th>
<th>Itemized Descriptions</th>
<th>Quantity</th>
<th>Per unit price</th>
<th>Extended Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>Dell Precision 450 dual processor workstations</td>
<td>25</td>
<td>$4,500.00</td>
<td>$112,500.00</td>
</tr>
<tr>
<td>Maintenance or Contractual Services</td>
<td>Maintenance contract with SGI</td>
<td></td>
<td></td>
<td>$24,000.00</td>
</tr>
<tr>
<td>Supplies</td>
<td>Item 1</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Construction Services (Planning &amp; Facilities)</td>
<td>Item 1</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Network Connections and Infrastructure Costs (UCCS)</td>
<td>Item 1</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Other Expenses (explain)</td>
<td>Item 1</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>Item 2, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Item 3, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Item 4, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Item 5, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Item 6, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Item 7, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Board of Regents Guidelines state "Technology fee revenues may be used - with caution - for new staffing that is either temporary or ongoing." (See Attachment 1, #6)**

<table>
<thead>
<tr>
<th>Object of Expense</th>
<th>Itemized Descriptions</th>
<th>Quantity</th>
<th>Per unit price</th>
<th>Extended Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Salaries</td>
<td>Item 1</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>Item 2, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Salaries</td>
<td>Item 1</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>Item 2, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fringe Benefits</td>
<td>Item 1</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>Item 2, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>$136,500.00</td>
</tr>
</tbody>
</table>
This is a classroom so it is necessary for all of the computers to be the same configuration.

11. Standard Dollar Amounts

The requested workstations are high end graphics machines with the following configuration:

*Dell Precision 450 Workstation with dual 3.06 Ghz Xenon processors, 1 Gbyte of RAM, 120 Gbytes disk drive, a CD RW/DVD drive and a 19 " FP display.*

Very high-end equipment is necessary to support the computer graphics and animation courses that are taught in this classroom. Two of these courses CSc 4840/6840 (Computer Modeling and Image Synthesis) and CSc 4841/6841 (Computer Animation) are cross-listed as Film (Film 4840 & 4841) and Graphics Design (GRD 4840 & 4841) and thus, have students from all three departments. These courses are taught in the COE 140 classroom using 3D Studio Max, a high end computer modeling and animation package. Creating images and animations using Max is very resource intensive. For example, computer animations require 30 frames per second so a two-minute animation requires 3600 frames. If each frame requires 10 - 30 seconds to render (not an unusually long time with the current machines) then a single animation will require 10 - 30 hours to render. This makes it impossible for students to experiment and do re-rendering. Since Max is threaded, it takes advantage of dual processors so that the new machines should be about 50-100% faster than the current machines, thus allowing students to create more images/animations in the same amount of time. As students create complex models these also require large amounts of memory and a very fast graphics card, otherwise the model and scene complexity is limited, as is currently the case. Another problem is that 3D Studio Max has very large memory requirements, 512 Mbytes is a minimum and it is usually necessary to have more. The students back up their files on CD-R’s and/or CD RW disks. The files are much too large to be saved on floppy disks (typical animation files size is 30-100 Mbytes).

Other Computer Science graphics courses are also held in COE 140 and the students will use the requested equipment for their assignments. CSc 4820/6820 (Computer Graphics Algorithms) and CSc 8820 (Advanced Computer Graphics Algorithms) use technologies such as OpenGL and Cg. These all require new generation graphics cards and a large amount of processing power. These languages are oriented towards fast real-time interactive graphics as used in games. The current machines do not support Cg well (they support only a small subset of the capabilities) so it is difficult to teach this.

Another course whose students will use this equipment is CSc 4620/6620 (Digital Image Processing). This is a new course designed to support the Yamacraw track for computer science students. Students use a freeware version of Matlab to do their projects. These projects are very compute intensive and will benefit from the computational capability of the new machines.

12. Standard Replacement Thresholds

See the above for justification. Also note that the old machines will be split between Computer Science and Mathematics and Statistics so that there is an effective life cycle of four years or more.

13. Prerequisite, Non-Technology Fee Funding

None

14. Matching Funds

None

15. Staffing and Other Support Availability
The department pays for a full time system administrator (Schaochieh Ou) who oversees the machines. Martin D. Fraser is his supervisor.

16. Space Availability and Impact on Facilities

CBSAC and Planning & Facilities Assessment of Space Availability and Impact on Facilities: This project does not impact facilities.

17. Impact on Computing/Networking/Security Infrastructure

UCCS Assessment of Network/Computing/Security Infrastructure: No additional impact on University network.

18. Post-Project Assessment Criteria

The primary project outcome will be that we can continue to offer modern computer graphics and imaging courses to the students from the different departments involved.

19. Review and Acknowledgements

Attach electronic notes or documentation showing that the following units or administrators have reviewed or acknowledged this proposal:

- Matching funds commitment from appropriate fiscal officer