

2009 Student Technology Fee Proposal Form

Title of Project: ET 308 CAD/CAM Computer Lab Upgrade

Department/Organization: **Engineering Technology**

Name(s) of Project Applicant(s)

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Amount Requested for project: **\$43,841.60**

Contribution by Requesting Organization: **\$45,000.00**

Important note: Before completing this form, please read the Proposal Form Instructions located on the STF website: <http://www.wvu.edu/stf/>

I. Project Abstract

Give an overview of existing environment, and summarize the items being requested. Include a brief explanation as to how the requested technology will improve student access to technological resources and/or enhance the *quality* of the student academic experiences through the use of technology and/or increase the *integration* of technology into the curriculum.

Exposure to modeling and analysis using Computer-Aided Design, Computer-Aided Manufacturing and Computer-Aided Engineering (CAD/CAM/CAE) software is a critical component in the training of engineers and technologists. Employers such as the Boeing Company have moved aggressively in recent years to doing all their design, manufacturing planning, analysis, and product data management using digital models. For graduates of Western's Engineering Technology department to be competitive in finding employment in today's global workforce they must exhibit proficiency with these tools. This fact is recognized in the ABET accreditation criteria that covers many of the department's programs: "modern computing equipment and software, characteristic of that encountered in the industry and professional practice served by the program".

The department strives to provide students with industry-type problem solving in courses and projects. Efficient computer hardware is essential to being able to create and simulate large models using the department's CAD/CAM/CAE software applications. Currently two labs (ET308 and ET262) with a total of 50 computers are supported by the department. Of these only ET308 (30 computers) can be used as an instructional lab. The hardware replacement cycle to keep up with advances in software is about four years assuming that the best configuration available at the time is purchased. The computers in ET308 are currently 4 1/2 years old and are no longer able to keep-up with the software requirements (computers in ET262

were replaced using funds from student lab fees in the past two years). Noticeable degradation in performance is starting to impact the ability of students to complete assignments and projects in a timely fashion.

In addition to upgrades, greater access to computers has been identified as a priority. Since these high-end workstations are not available in the ATUS labs, ET308 and ET262 must handle the needs of the 490 students in the department. As such the department wants to increase the number of computers in ET308 to 52 workstations. This increase will help the department schedule larger lab sections, reducing the number of sections and creating extra open time for students to work on assignments and projects. A larger computer lab will also encourage courses with larger enrollment to introduce CAD/CAM/CAE content. This will help increase student exposure to CAD/CAM/CAE technology.

This proposal asks for matching funding from the STF to help replace and increase the number of computers in ET308. 52 high-end workstations (50 student workstations + 1 instructor's station + 1 for administration of the lab) will be purchased with these funds. In addition, some minor infrastructure changes that include increasing network, security and power connections, installation of a mechanical projection screen and repositioning of the instructors podium are being requested.

II. Relationship to STF Objectives and Impact upon existing Academic Programs

Describe your proposed project in detail. Tell us how it will provide positive benefits to specific courses or instructional programs.

1. From a student perspective:

- a. How would this project provide additional student access to technological resources?

This proposal includes an increase of 20 computers over the current size. By doing this the ETEC department will have a computer lab with 50 computers that the ETEC students will be able to use. These machines will be specially configured to support running advanced CAD/CAM/CAE software in a manner that is not available on the configurations in the ATUS labs. With more of these higher-end workstations available students will have easier access to the tools required for their course work and projects. In addition, having more computers will facilitate greater use of CAD/CAM/CAE software through increased open hours and in courses with higher enrollments without the need to increase the number of sections offered.

- b. How would this project broaden or enhance the quality of the student's academic experience through the proposed technology?

The computer-aided design, computer-aided manufacturing, and computer-aided engineering (CAD/CAM/CAE) software utilized in the Engineering Technology Department is the same or similar to software used in industries such as the Boeing Company that employ the department's graduates. In order to fully utilize the power of the software, current computing hardware is needed. The computers currently in use are 4 1/2 years old and they are now

showing signs of increased wait times when tasks are being performed. With increased wait times, assignments and projects take longer to complete and student frustration levels increase. With the new computers, these wait times and frustration will decrease. The students will see how powerful the software can be while working on real-life projects.

- c. How would this project integrate technology into coursework?

This lab is extensively used throughout the curriculum in the ETECC Dept. By upgrading the computers, the students will be able to work with the most current versions of our CAD/CAM/CAE software running on industry-comparable computing hardware. The current size of the departments CAD lab limits sections to 25-30 students. This acts as a disincentive for courses with larger enrollment to include CAD/CAM/CAE content due to the need to create multiple sections to schedule these activities. With the increased number of computers that will be available with funding from STF this limit will be increased significantly affording a broader range of courses the opportunity to use this resource.

2. From a **faculty perspective**, explain how this project will enhance your ability to help students meet their educational goals.

As faculty, the goal is to provide the students with experiences working on real-life projects. We have the software available to do this, but are limited by the amount of computing resources available and degrading performances as the hardware ages over time. This is partly due to the software we use being continually updated/upgraded to exploit faster processors and larger memory. While it is unrealistic to expect changes to computer hardware every 2-3 years (the rate in industry to keep up with software releases), the ETEC computers are now over 4 1/2 years old and slowing to the point where faculty needs to adjust projects to match what can be accomplished on the hardware in a reasonable amount of time. Since our Industry members and the requirements of ABET accreditation of our programs require that we stay current so students are prepared when they enter the work force, new computers are required that keep up with software computing requirements.

3. Will other departments be involved with this project? If so, please describe.

No

4. Has any part of this project previously been funded by STF?

No

Yes

(Please describe): **In 2004, an STF Grant was funded to upgrade to the current set of computers. Those computers are currently 4 1/2 years old and noticeable degradation in their performance can be seen as students work on them for the increasingly complex projects they are assigned as they advance through their program.**

III. Utilization

1. Please list the anticipated number of times and duration per each use, per quarter, that the proposed technology will be used by students.

Structured Course Labs/Tutorials with Assignments and Projects Using Equipment:

ETEC 110	- 25	Students @ 120 hr/student	@ 8 Section/year	=	24,000 hrs
ETEC 111	- 25	Students @ 120 hrs/student	@ 6 Sections/year	=	18,000 hrs
ETEC 361	- 25	Students @ 160 hrs/student	@ 1 Sections/year	=	4,000 hrs
ETEC 362	- 25	Students @ 160 hrs/student	@ 1 Section/year	=	4,000 hrs
ETEC 322	- 18	Students @ 80 hrs/student	@ 3 Section/year	=	4,320 hrs
ETEC 426	- 20	Students @ 80 hrs/student	@ 1 Section/year	=	3,200 hrs
ETEC 225	- 36	Students @ 48 hrs/student	@ 2 Section/year	=	3,456 hrs
ETEC 397*	- 25	Students @ 160 hrs/student	@ 1 Section/year	=	4,000 hrs
ETEC 325*	- 30	Students @ 18 hrs/student	@ 1 Section/year	=	540 hrs
ETEC 461*	- 10	Students @ 160 hrs/student	@ 1 Section/year	=	1,600 hrs
TOTAL =					67,116 hrs or 1290 hrs/computer

*New course that will be using ET 308

Non-Structured use of computers:

1. **Senior Projects:** Students taking senior projects in many of our programs use computers for CAD/CAM/CAE work.

2. **Student Team Competitions:** This includes, human-powered submarine, human powered vehicle, SAE formula one and mini-baja, all use CAD/CAM/CAE software in the design and fabrication of their entries. These teams are considered a critical part of the education experience for our students.

3. **Preparation of Reports and Presentations:** With the increase in computers to 50 the department has approved installing the MS Office suite on the computers. This will allow students to better integrate visuals and results from CAD/CAM/CAE applications in their reports and presentations.

IV. Project Budget

This section of the proposal details the estimated cost of the project. Please include costs that will be covered by your department or another source, for ongoing costs such as personnel or operating expenses.

To assist you in preparing your budget, please consult with relevant campus support departments (ATUS, Purchasing, Space Administration, etc.) For more information, see this page on our website: <http://www.wvu.edu/stf/instructions.shtml>

ATUS has developed standard configurations for desktop and laptop PCs and Macs. Your project is not limited by these standards, but these figures may be helpful. Standard configurations can be found on the Student Technology Fee website: <http://www.wvu.edu/stf/instructions.shtml>

Please complete all of the following sections (attach Excel spreadsheet for any additional details).

Item	Quantity	Item Cost	Total
Dell Computer - PWS T3400 525W (32 bit) see attached configuration	52	1246.10	64797.20
Add Power connections ** (Asterisks indicate estimate by applicant)	20	120.00	2400.00
Add Network Jacks **	20	120.00	2400.00
Add Security connections**	20	180.00	3600.00
Upgrade existing Security connections**	32	180.00	5760.00
Manual Screen - Larger screen to increase size of projection for viewing	1	1000.00	1000.00
Screen Installation** - On North wall of ET308	1	1000.00	1000.00
Modify Instructor's Podium** - Move to North wall - Shorten by 2 feet	1	1000.00	1000.00
Shipping (taxable)	1	0	0
Tax (8.4%)	1	6884.40	6884.40
Total			88841.60

We recognize your proposed budget as an estimate. Final funding for successful projects will be established after through technical review; some costs may need adjusting due to price changes. The STF Committee may impose special conditions may upon a project. See Sections B.7 & B.9 of the STF Mission Statement <http://www.wvu.edu/cms/WWU.STF/mission.html>

1. What funding is available from your department or other sources?
\$45,000.00

2. Could this project be divided into discrete elements that could be funded separately?

No Yes Please summarize and prioritize project segments with cost estimate for each segment.

3. Are lab fees charged for any of the courses that will use this equipment?

No Yes If yes, please note: the total funding requested from the STF must reflect the amount collected from course fees for equipment replacement and/or equipment acquisition. All proposals asking for course fees will be reviewed by the Academic Budget Office.

The \$45,000.00, from the ETEC Department is from the lab fee collected for classes that use the lab. These fees will continue to be charged so that the ET Department can have matching dollars when future upgrades to the hardware are required.

V. Impact on Existing Resources

The proposal should address your project's potential impact on existing resources. Special attention should be given to impact on data transmission networks (e.g. sources accessed, networking equipment, etc.), and personnel (e.g. staffing, administrative support, faculty support, etc.).

Any proposal that includes the replacement of computers should specifically address the feasibility and cost effectiveness of upgrading the computers rather than replacing the computers.

1. Describe how existing equipment is used. Contrast this to projected use if your project was funded.

The current batch of computers is 4 1/2 years old and, given the age, is used to the fullest extent of their capabilities running the latest versions of the CAD/CAM/CAE software used in ETEC courses. Because of available funding resources, we have not been able to purchase a configuration that fully matches the best specs required for the work students do. Video cards, RAM, and processing power have been sacrificed in order to get the required number of computers into the lab. These lower specs, while not optimal, still function but their life compared to software capabilities quickly diminishes over time. Significant reductions in performance have been noticed after three years of use.

The new computers obtained with STF funding will be used in the same way as existing computers but with updated computing abilities so as to delay reductions in performance to match a 4-5 year replacement cycle. The old computers will be moved into labs within the ETEC Department to serve as work machines alongside a piece of equipment. If there are computers left after this, they will be made available to the campus.

2. Is similar equipment or technology available elsewhere on campus—such as the Student Technology Center, Classroom Services, Video Services, Western Libraries, a college lab? If so, please describe why the existing equipment doesn't meet the needs outlined in this proposal.
- 3.

No. The ETEC computer labs are the only labs that are configured to utilized the CAD/CAM/CAE software to its fullest. We currently work with ATUS to get some of our software installed in ATUS labs, but there are some limitations due to video card configuration, RAM memory amount, etc...

4. If this project involves the replacement of equipment:
- a. Describe the 'before and after' configuration changes. A spreadsheet reflecting these changes can be attached.

New computers will have the following key enhancements:

- **New processors: Core 2 Duo vs. Pentium IV with faster clock speeds.**
- **Increased RAM: 2GB vs. 1 GB**
- **More advanced graphics card**
- **Larger hard drive: 160 GB vs. 40 GB**
- **New monitor: A flat panel display to replace a CRT display reducing the footprint and power consumption.**

Newer machines also come with more efficient power configurations. As everything is moving to be earth-friendly and green, power consumption is being monitored and reduced in newer computers. By replacing the computers, the ET department will be able to reduce the load required by the old computers.

- b. Describe the costs and benefits of replacing vs. upgrading (if applicable).

The cost to upgrade 4-year old computers is far greater than replacing. The old computers would require a new motherboard, processor, video card, RAM, and other items. At that point, you have spent more on individual components, as compared to a new computer. You also have to deal with the fact that an upgraded computer, which is out of warranty, is more costly to maintain when compared to a new computer with a warranty.

5. Will this equipment be available to students outside your department?

No Yes

6. If the proposed technology will be used by students outside your department, please describe how they would gain access, how the availability of the equipment will be publicized, the hours/week when the equipment will be available, and any costs that would apply.

Students from outside the department use this lab as they take ETEC courses which require its use. All students are given accounts so that they can log on to the computers.

7. Does this project involve the check-out of equipment to students?

No Yes If yes, please discuss whether or not the Student Technology Center could be assigned this task.

6. Does the department have adequate operating funds to provide on-going maintenance and support?

No Yes Please describe.

The department has a lab fee associated with the use of this computer lab to maintain/replace the computers and software as needed.

7. Does the department have adequate personnel funds to provide on-going staff support for this project?

No Yes Please describe,

Several faculty members act as point-of-contact for issues in the labs. The Department has access to a technician from the College of Science and Technology with one-half of his time is devoted to ETEC computing requirements. This has proven adequate for our needs.

VI. Space and Site Information

This section addresses any space alteration or site preparation necessary for the proposed project. Site alterations include painting, holes in walls, security systems, carpeting, construction, lighting changes, or conversion of a lab or office

Special Note: If this project requires any site preparation, or if this project uses any space not currently under control of the department, a draft proposal must be submitted to Space Administration by **Friday, November 14, 2008**. Space Administration and Facilities Management will conduct a site survey and respond back to you with information concerning project feasibility, cost, and schedule. This information must be included in the final project proposal.

Proposals for projects that involve any site preparation will be considered only after the required site survey by Space Administration and Facilities Management has been completed.

1. Location for installation of equipment or technology.
ET 308

2. Is site modification required?

No Yes Please describe. (Electrical, air, painting, lighting, security, network access, etc.)

- 1. New power will need to be routed to all the workstations, so that proper power requirements are met.**
- 2. An additional 20 network jacks will be needed in the lab.**
- 3. Current security will need to be moved from existing computers to the new computers, including security for the addition of 20 computers.**
- 4. Security upgrades are needed for the current 32 workstation sites.**
- 5. A larger manual screen will need to be installed on the north wall of ET308 to accommodate a new layout of the lab.**
- 6. Instructor's podium will need to be moved to north wall and modified (shortened)**

3. Will this project use space not currently assigned to your department or area?

No Yes Please describe.

VII. Project Schedule

This section describes your overall implementation schedule. Project awards will be announced by the end of spring quarter. It is anticipated that projects would be substantially completed by the

end of the calendar year. If there is any site preparation involved, please align your project schedule with the schedule provided by Space Administration and Facilities Management. **This classroom/lab is used throughout the academic school year and so any work will be schedule during the summer months so not to disrupt lab use.**

VIII. Constraints

This section should list any external or internal factors that could affect your project schedule, project objectives, or the project budget (e.g. if external approval is required for curricular changes, or if funding must be received by a certain date).

1. Please describe any constraints to this project.
Funding will be required by the start of summer so that the space alterations and computer installation and configuration can be completed by the start of the Fall 2009 Quarter.

IX. External Funding

This section must be completed for any **projects over \$100,000**. For project budgets of this scale, the applicant should investigate opportunities for obtaining external funding for all or part of the proposed project.

1. Describe the external organization(s) able to provide funding in support of this project.
2. Describe the funding cycle for these requests (submission dates, projected award dates).
3. Indicate the amount of external funding that would be requested.
4. In cases where joint funding is requested, what will happen if the STF award is made and the external grant is not awarded?
5. Has a grant proposal already been submitted for all or part of the proposed STF project?