



**Department of Engineering Technology**

College of Science and Engineering Technology  
SAM HOUSTON STATE UNIVERSITY

# Post Implementation Report

2022 COURSE ENHANCEMENT MINI-GRANT  
(STEM CENTER – SAM HOUSTON STATE UNIVERSITY)

IFTEKHAR BASITH (iib002@shsu.edu)



# Department of Engineering Technology

College of Science and Engineering Technology  
SAM HOUSTON STATE UNIVERSITY

## Contents

<b>A copy of the original proposal.....</b>	<b>2</b>
<b>A summary explaining which elements of the proposal were: .....</b>	<b>4</b>
<b>Completed according to plan.....</b>	<b>4</b>
<b>Modified from the original proposal.....</b>	<b>4</b>
<b>Materials for one (or more) student learning activities sponsored by the grant.....</b>	<b>4</b>



**A copy of the original proposal**

**Title:** STEM Course Enhancement – Animated Safety modules for Freshman Circuit Class

**PI:** Iftekhhar Ibne Basith, PhD, ACUE, Engineering Technology (ETEC)

**Budget:** \$2000.00

**STEM Course involved in this proposal:** ETEE 1340 – Introduction to Circuits

**Project Narrative:**

- **Executive Summary:**

Engineering Technology differs from traditional Engineering in a sense that courses are hands-on and laboratory works are integrated in the course syllabus. It requires students to have access to many complex and risky equipment's and use them safely. Some of the equipment's includes but not limited to power supply, signal generator, oscilloscope, resistor, capacitor, inductor, multimeters, FACET boards etc. Thus, having the students educated about LAB safety is important to keep students' accident free during LAB activities and preserve the equipment's well. While every instructor in this course briefs about safety requirement in the beginning of the semester and department is working towards a safety manual for the same purpose, the absence of visual animated modules may make these texts/manuals/lectures unattractive to the students. In this digital age, students prefer visual interaction and learning through graphics. This is exactly the purpose of this fund request.

- **Project Description:**

I am currently working on a United States Department of Agriculture's (USDA) grant project to develop animated visual curriculum modules for Plant Biosecurity. We'd use the same components to develop animated learning modules for electronics safety for the freshman course ETEE 1340. The project will involve use of Maya, Houdini, 3ds Max, ZBrush and other available animation software. These animated safety modules should enable active learning and help students make meaningful connections to course safety concepts.

- **Description of the course and student population**

ETEE 1340 – Introduction to Circuits is a major core course for all Engineering Technology (ETEC) programs. The students enrolled in this class are from diverse degree programs under the ETEC umbrella and not necessarily only from Electronics and Computer Engineering Technology major. Construction Management, Engineering Design Technology, Safety and Electronics concentration, Mechanical Engineering Technology students must take this course as well. In both Fall and Spring, we have minimum 5 sections of the same course and at least 24 students in each section.



# Department of Engineering Technology

College of Science and Engineering Technology  
SAM HOUSTON STATE UNIVERSITY

- **Expected Outcome and Dissemination plan:**

Below is a timeline for the proposed project:

<b>Project Timeline: (January 1, 2022 – April 30, 2022)</b>					
<b>Activity</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>Post Project</b>
Bi-weekly meetings to review project progress and plan of action.	X	X	X	X	
Design of interactive learning objects on different Safety Equipment's	X	X	X	X	
Use the learning modules as test case in ETEE 1340 Spring 2022 section				X	X
Review content and update modules for accuracy and thoroughness				X	X
Disseminate the safety modules for all ETEE 1340 sections starting Fall 2022					X
Added to ETEC website and Safety Manual					X

Once the safety animated module is developed, it will be shared with all other ETEE 1340 sections, ETEE 2320 – Circuits and Systems, ETEE 3350 – Analog Electronics, ETEE 3345 – Digital Electronics, ETEE 4355 – Electronics and Digital Communication etc. These will also be shared in ETEC website and safety portal for ETEC.

- **Budget Justification:**

To enhance the ETEE-1340 courses with animated safety modules, the following budget is requested:

1 UG Student Assistant	\$1,000
Faculty Stipend	\$1,000
<b>Total</b>	<b>\$2,000</b>

Since most of the software licensing is available due to ongoing USDA fund, we won't need extra funding for software licensing purchase. We requested funding for the student who will work for the animation. The PI will primarily work with the student for all necessary safety information and equipment's.



## **A summary explaining which elements of the proposal were:**

### **Completed according to plan**

- The safety video is developed using animated modules.
- The developed module is disseminated to ETEE 1340-05 section for Fall 2022.
- The developed module is shared with other faculties teaching ETEE 1340 section (1-4) to disseminate among their class and collect feedback.
- Students are requested to submit 1-page summary based on the video as how this animated tool is preferred over usual reading of safety manuals and thus providing active learning.

### **Modified from the original proposal**

- The developed video also contained modules from FANUC robot arm, and other basic lab safety and regulations.
- The content is shared in Industrial Robotics (ETEE 3313) and Microcontroller Applications (ETEE 3376) classes this Fall 2022.
- The content will be shared with ETEE 4355, ETEE 3345, ETEE 3350 and ETEE 2320 students in Spring 2023, based on the feedback received from this Fall 2022.
- The student working for this project graduated end of Spring, and the module is finished 90% of what was planned. Voice over the developed module could not be completed.
- The safety committee will resume soon at Engineering technology department and this video will be shared with them for further review and feedback.
- A supplemental funding is requested for Spring 2023, to improve this video based on feedback received during Fall 2022 and Spring 2023 to add voice over the developed module.

## **Materials for one (or more) student learning activities sponsored by the grant**

Visual learning is an important strategy of academic learning. Research shows that visual learning helps in storing information for longer. Study indicates that visual learning increases retention by 29-42%. According to several other studies, it is evident that the following are true [1]:

1. 65% of population are visual learner, versus only 10% are auditory learners.
2. Our eyes can process 36K visual messages per hour. Thus, the processing times for visual information is 60K faster than text.
3. Visual aids increase academic learning by 400%.

## **Some Comments from the test data**

### **ETEE 1340-05**

To begin, this video was rather short but had very good points throughout the entire video. They really did a good job of keeping it short and simple – ETEE 1340-05 (Fall 2022)

I think that this video helped the examples of safety procedures stick out more clearly to me than it would have if I had read it from the textbook. Often when I am just reading about something I have trouble visualizing what the text says so I found the visual representation helpful – ETEE 1340-05 (Fall 2022)



## Department of Engineering Technology

College of Science and Engineering Technology  
SAM HOUSTON STATE UNIVERSITY

liked the format of this video because the animations made it feel more modern and it was easy to follow. Many other safety videos feel very outdated and are hard to follow. The animations also did a good job of showing examples of lab safety mistakes and showed how they could be avoided. From the video I learned different ways to keep myself and everyone in the lab around me safe – ETEE 1340-05 (Fall 2022)

believe the animated modules helped me pay more attention than reading through a book because it was constantly changing. It is much easier to remember things by watching something and seeing it versus steadily reading a bunch of pages of words. When you make learning fun and entertaining such as labs, you're more likely to retain said information – ETEE 1340-05 (Fall 2022)

Personally, watching the animated, visual represented lesson was fairly helpful towards my learning compared to reading a textbook, or likewise, because I find that having a visual component as well as being verbally taught, and the ability to pause when I need to, accommodating to my learning abilities and furthering of knowledge – ETEE 1340-05 (Fall 2022)

I think that this was indeed better than if we were to have to read through safety manuals, but with that said it would have been amazing if they video were to have audio. That would have made it much easier to understand the video instead of just reading that caption in the bottom of the video. With that said the actual video and the modules inside of the video were quite good and easy to understand even though there was no audio – ETEE 1340-05 (Fall 2022)

I really liked the animated modules in this video. They made it interesting to learn about lab safety while also being informative. They allowed me to visually learn some dangers that can occur in a lab instead of just reading about it from a lab safety book. I am more of a visual learner, so being able to see it versus just read about it was a major plus – ETEE 1340-05 (Fall 2022)

I enjoyed seeing the animated modules because some of them were amusing but also, they depicted the safety procedures and equipment that we use in the lab better than just reading off a manual – ETEE 1340-05 (Fall 2022)

### **ETEE 3313**

I liked the demonstration of the individual working with the Fanuc robot and how everything was demonstrated. However, I didn't like the lack of sound, background music, or anything else – ETEE 3313 (Fall 2022)

I overall enjoyed this lab safety video and thought it covered some very important topics and even refreshed my knowledge on a few of these safety tips. I really liked the animated parts of this video because they showed a demonstration of dos and don'ts. Also, I thought the animated parts were funny at some points so with them being included throughout the video I thought it made it more enjoyable overall – ETEE 3313 (Fall 2022)

The animated modules were entertaining and informative at the same time. With technology advancing rapidly, information can be better understood in video form than paper. Personally, I am a visual person, so a video is how I would prefer to learn something rather than having to read from a safety manual. A video is especially helpful in pointing out buttons or functions on a machine or controller, instead of having to flip back and forth 10 to 100 pages – ETEE 3313 (Fall 2022)

Visually seeing the modules has helped me better understand the dangers of electricity and robotics and



## Department of Engineering Technology

College of Science and Engineering Technology  
SAM HOUSTON STATE UNIVERSITY

the arm's movements instead of the manual. As the manual doesn't help show just how these effects can occur if they happen visually. It helps us as students see how some of these lab safety precautions are by using pictures and explanations – ETEE 3313 (Fall 2022)

### **ETEE 3376**

This was fun to see in comparison to the book because when reading about the types of accidents, our imagination is all we must picture the events that can become, but when watching the video, we got to see the action happen as it was being explained – ETEE 3376 (Fall 2022)

I liked the animated modules because it made the video more interesting and helps the viewer see how everything would look like. When reading a usual safety manual, the reader gets tired of reading and can get bored after so much reading – ETEE 3376 (Fall 2022)

It also was a very good reminder of some safety rules talked about in classes before. I also knew that we are not supposed to wear rings, but I had forgotten, and the video explained why – ETEE 3376 (Fall 2022)

Overall, this lab safety video taught us a variety of information about voltage phases and variations, PPE, troubleshooting, robot safety, and how to correctly maintain electrical system efficiency. The more we understand, the safer we will be in these situations – ETEE 3376 (Fall 2022)

### **Statistical Information**

Below table shows participation details for each class.

<b>Course Name</b>	<b>Total Students</b>	<b>Responded</b>	<b>Positively impacted</b>	<b>Need Improvement</b>
ETEE 1340-05	28	19 (68%)	16/19 (84%)	3/19 (16%)
ETEE 3313	10	8 (80%)	6/8 (75%)	2/8 (25%)
ETEE 3376	12	8 (67%)	6/8 (75%)	2/8 (25%)

### **Suggested Improvement**

Few students suggested the addition of voice over, and vocal description rather than captions/text. A supplemental small amount (\$500) will be requested for 2022-2023 STEM Center Mini Grant to achieve this feedback.

### **Acknowledgement**

The texts and information are provided by Dr. Reg Pecen, Professor, Engineering Technology

### **Reference:**

[1] <https://www.embibe.com/exams/visual-learning-benefits-and-strategies-for-students-teachers>