

## **FINAL REPORT**

The STEM Center at SHSU – Mini Grants  
*Scholarship of Teaching and Learning Proposal*

# ***A Hydroponics Indoor Growing System for Teaching, Learning, and Nourishment***

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Funding for this project: \$2000 (Spring 2023)

STEM course targeted in Spring 2023:

GEOG 3301\* – *Environmental Geography* (enrollment: 35) – an ACE-designated course

Project equipment can continue to be used in GEOG 3301 along with other classes from now on (\*ACE-designated): GEOG 1300\* (*People, Place and Environment*); GEOG 2341 (*Physical Geography*); GEOG 3320 (*Sustainability and Environment*); GEOL 3326 (*Environmental Geology*); GEOG 3310\* (*Sustainable Development*); and GEOG 4331 (*Conservation and Natural Resources*)

### **Project Description**

The Department of Environmental and Geosciences currently offers a wide range of courses where sustainability concepts are essential. Field experiences and hands-on activities that happen in these STEM courses spark more interest in science and are essential in relating course content to actual skills which ultimately leads to jobs. In 2021, Dr. Ross Guida and I wrote an Engaging Space proposal to renovate LDB 339 to an active-learning classroom. Due to supply chain delays and inflation, room renovation costs exceeded what was projected and the active learning tools and equipment for the room was cut.

In the original proposal, a living wall was proposed. Living walls help improve air quality, not only because plants naturally remove carbon dioxide and produce oxygen-rich air, but also because plants can filter the air around them by absorbing pollutants. Inside a building, living green walls frequently act as a three-dimensional living piece of artwork, providing an aesthetic component as well as a health element. Living walls buffer noise and provide a sense of calm within an engaging classroom space. Class activities would have involved learning about growing and maintaining native and local plants in the living wall.

Indoor living walls require waterproofing, and since LDB has had plenty of issues with water damage, a better active learning equipment that would provide the same benefits, is an indoor hydroponics growing system. In addition to learning about how to grow food indoors, researching the different plants and growth requirements, students will also see first-hand sustainability concepts like zero food miles and waste, less impact on land and water resources, and the health benefits of incorporating more herbs and greens into their own diet. The PI's class, *Environmental Geography* (GEOG 3301), is a designated ACE course, and by growing a variety of vegetables in this hydroponic system, students can then donate surplus fresh vegetables to the local food pantry.

This interactive and engaging indoor hydroponics system can easily be shared/used in any STEM course on campus. Every student that uses this equipment will benefit from learning how easy it is to grow their own vegetables and herbs indoors, which will benefit them (and a bit of the Earth) for life.

### **Project Reflection**

The PI is super thankful to the STEM Center! The indoor hydroponics system was purchased in January 2023. The student assistant assembled the equipment, researched, and presented a lecture on the basics of

hydroponics systems to the GEOG 3301 students. The class then researched the best plants to grow. Given the size of the hydroponics system and spacing of the seed pods, our class determined that leafy greens would be the best, and most appropriate for college students and their diets. Class lectures were supplemented with discussions on the pros and cons of an indoor hydroponic system, including the importance of zero food miles and minimal impact on land and water resources.

By March 2023, our seeds began to sprout, and we were ready to be place our pods into the indoor hydroponic system. The student worker began the final phases of installation that involved linking the indoor hydroponic system to a smart plug linked to an app to control water and lighting functions for the system. Unfortunately, a new law passed in Texas requiring all equipment to go through a security audit. Because our system is from Singapore, it received more scrutiny, and it was a long process and wait time to be cleared. After two months, the PI was notified that IT would NOT clear the equipment saying, “the audit failed the wireless smart plugs on the grounds that they were not secure and were incompatible with our system.” Luckily, they did approve an alternate digital timer that would be offline and not require a security audit. The Department of Environmental and Geosciences quickly purchased the timer, and the equipment will be ready to go by mid-July 2023. The project is delayed, but the PI will work with our department student orgs to do a test phase of our first “crop” during the Fall 2023. The original plans to incorporate the project with GEOG 3301 students will occur from Spring 2024 and beyond, with surplus leafy greens donated to the local food pantry.

### **Financial Reporting – Spring 2023 (\$2000)**

- 1) Indoor Hydroponics Growing System - \$1200
- 2) Student Assistant - \$800 (to assist with initial assembly, researched the equipment, presented hydroponics basics lecture to GEOG 3301, and running & maintaining equipment throughout the project)

