Office for Faculty Excellence
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CSIT 104 Python Programming I

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Program

Teaching Innovations Program (TIP): a year-long program that supports faculty teams in developing or redesigning a course or academic program.

Intervention

We piloted a **studio-based learning approach** that emphasizes active, small-group presentations and discussions during lecture sessions. In this format, each student is required to present and explain their programming assignments line by line, while peers provide constructive feedback and suggestions. As a culminating experience, students complete **a final project involving Raspberry Pi** and a range of environmental sensors. Each group is tasked with designing a Python-based application that integrates key programming constructs along with the sensors and cameras introduced throughout the semester. To ensure consistency in assessment, we also implemented a **common final exam** across all sections of *CSIT 104* in both Fall 2024 and Spring 2025.

Participating faculty

Michelle Zhu and Yan Kong

Implementation

1. We developed structured in-class Python lab discussion guidelines for both students and facilitators to follow.
2. All instructors meet regularly to coordinate the pace and content of lectures and lab sessions.
3. The common midterm and final exams are collaboratively designed and reviewed by all instructors across sections.
4. We created comprehensive Raspberry Pi project lab documents and tutorial materials to be used in all sections.
5. Graduate Assistants are required to complete hands-on training to become proficient with both the hardware and software components.

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Course Redesign Goals and Analysis

Summary

The objective of the CSIT TIP intervention is multifaceted: to ensure consistency across sections, enhance students' hands-on programming skills, inspire them to see how coding powers real-world applications, and enhance their communication and collaboration skills.

Goal 1: Enhance the consistency across multiple sections by coordinating the content, midterm, and final exam.
Status: Completed
Discussion: All sections now teach the same chapters and use the same exams.

Goal 2: Help students see how Python coding translates into meaningful, real-world solutions.
Status: Completed
Discussion: Students design a computer system that integrates analog circuits and sensors based on their individual interests. Python is used to manage the system's input, processing, and output.

Goal 3: Enhance students' communication abilities and collaborative skills through team-based project work.
Status: Completed
Discussion: Students typically work in groups of 3 to 5 and are expected to collaborate both during and outside of class to complete their lab assignments.

Student Perspectives

Some Students' Responses to Survey Question in FA24:

What was your favorite part of this course and/or what did you find most valuable?

- *"Whats most valuable in this class is that professor provided discussions every Friday which was made it a better learning experience which helped us review some useful python tips when going thorough homework and labs."*
- *"Working in groups"*
- *"Raspberry pi project, group discussions"*
- *"My favorite part of this course was learning Python as a programming language as a beginner in the Computer Science major."*
- *"The labs and I found most valuable were the labs we did"*
- *"Your class wea able to teach me about what hardware and software was and how it meshed together. I wanted to say that this was something that helped spur my interest in hardware, as well. The Raspberry Pi project that we did also helped me in terms of team-building skills and understanding various forms of software. "*

Next Steps

The next step is to implement these practices across all major-designated sections. Beginning in Fall 2025, we have started separating students into major and non-major sections. The Raspberry Pi project will not be included in the non-major sections. Additionally, all lab documents will be thoroughly proofread and shared with all CSIT 104 instructors via a Google Drive folder.