Title

Sustainability Workshop: Sustainability in Electronics Design

Prerequisities

1. Undergraduate CS/CE/EE student
2. A basic understanding of circuits

Course Objectives

- Explain the concepts of carbon footprint, embodied and operational carbon in electronics
- Describe how material choices and energy use contribute to an electronic device's overall carbon footprint
- Analyze products using a Life-Cycle Assessment framework to quantify their carbon footprint
- Evaluate design carbon cost vs. performance tradeoffs in sustainable electronics by comparing their environmental impacts
- Adopt and promote energy-saving habits in everyday decision-making

Course Description

Sustainability is too often an afterthought in engineering education and practice. With growing environmental concerns, it's crucial to train future designers and engineers to consider environmental impact from the outset. This workshop is designed to introduce the concepts of embodied and operational carbon to first and second-year ECE/CS students. Students will leave with an understanding of carbon footprint and how their choices contribute to it, and a working knowledge of how to apply Life-Cycle Assessment techniques in engineering design.

The course's culmination is an activity designed to demonstrate the tradeoffs between different materials. Students will design two circuits—one using copper-tape traces and the other using carbon paint ink. They will calculate the embodied carbon of the materials, compare the operational carbon by measuring power consumption, and synthesize these findings to understand the tradeoffs between different materials used in engineering.