

2025 TIP Winner

Modules to introduce social issues into foundational engineering courses

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Engineering courses exclude social issues.

Foundational courses (like *Introduction to Circuits*) are taught from a technical perspective and they exclude social issues.

Rationale for including social issues

Real-world problems

Accreditation bodies

Licensing agencies

Challenges faced by instructors

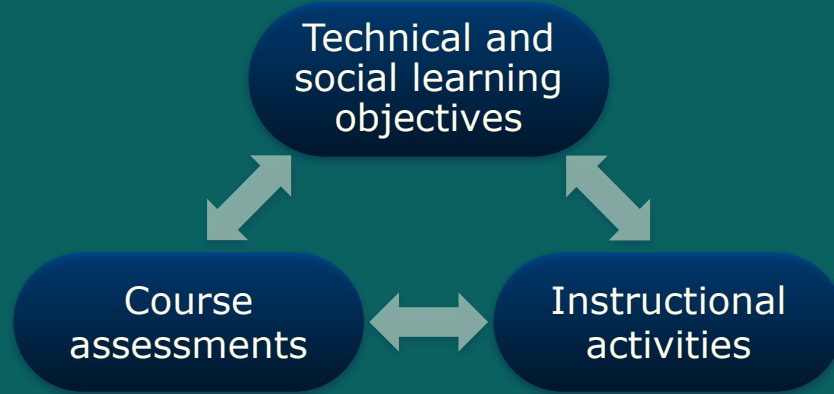
Expertise

Teaching & assessment

Time

We've created modules to add social issues.

We use *backward course design* principles.



The modules link social issues with technical circuits content.
The modules connect to students' lives and experiences.
Comprehensive teaching guides make it easy with:

- Pre-class activities, slides with talking points, in-class lesson plans, homework and exam questions.



We have several tested modules.

Topic	Technical	Social
Module 1: Conflict minerals	Capacitors	Mining conflict minerals in the Democratic Republic of the Congo
Module 2: Electric vehicle batteries	The voltage divider	The circular economy, issues related to EV battery life
Module 3: Energy efficiency	Power and energy	Sustainable Development Goals, LED vs. light bulb
Module 4: Prioritizing power in hospitals	Equivalent circuits	Red outlets in medical settings, prioritizing redundant branches



Student feedback has been positive.

Students began to internalize their social responsibility.

Students found the modules interesting and impactful.

Students appreciated learning about social implications of engineering as related to the technical course content.

Obviously, we looked at a lot of stuff that wasn't engineering, including the conflict minerals ... which I thought was really cool. And that was very clearly ... engineering, but at the same time, it was very clearly like looking at it from different angles.

... the conflict mining homework showcased what's going on in the world relating to the current material. I wish we had more homework like that.



...lectures like these should be present in all engineering disciplines, even if the classes aren't about social/political/economic/environmental issues.

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I really enjoy this type of lecture, because I am able to connect the technical concepts I learn with real-world issues.

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...we are a part of the issue if we don't decide to fix it.

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I loved getting to talk about social issues in class.

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Thank you to...

- the **Provost** and **CRLT** for selecting me for the TIP,
- **Pete Seiler** and **Lisa Li**, my ECE colleagues who nominated me for the award,
- **Susan Lord**, my collaborator at University of San Diego,
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- **Fred Terry**, my ECE colleague who is using the modules, and
- the **undergraduate students** in my course who engaged in the modules.