

Massive Open Online Labs?

Microelectronics at Home



The challenge

- Significant growth of ECE program over past 5 years
- Limited laboratory space and equipment

How to continue to provide high-quality instruction to many students?

The opportunity

- Open-source hardware and software
- Low-cost components and equipment

NI myDAQ



Pilot study

- 14-person summer microelectronics course
- Half worked in lab, half worked remotely
- Remote work performed with NI myDAQ
- Students provided with high-quality instructional videos
- Findings published in conference proceedings of the American Society for Engineering Education

Are students comfortable building circuits?

	Very comfortable	Somewhat comfortable	Somewhat uncomfortable	Very uncomfortable
With instructions	64%	36%	0%	0%
Without instructions	0%	64%	18%	18%

Student feedback on lab experience

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
myDAQ lab took longer	55%	18%	18%	9%	0%
Liked doing lab outside of class	0%	18%	45%	27%	9%
Knew how to get help	18%	45%	0%	18%	18%
Disadvantage not to have TA	36%	55%	9%	0%	0%

Successes

- High-quality instructional videos
- myDAQ hardware platform and accompanying software
- Laboratory documentation

Recommendations

- Anticipate hardware failure—test all components thoroughly before lab
- Provide TA assistance—videoconference where students can show their circuits
- Encourage lab meetings—get students to troubleshoot collaboratively