TEACHING AND MENTORING STATEMENT

Engineering becomes meaningful when students build, test, and explain

Lawrence Arthur | Classroom foundations - Laboratory evidence - Complete systems - Public communication

Teaching philosophy

I teach engineering as a disciplined process of connecting principles to evidence and decisions. Students should understand the theory, measure physical behavior, build or analyze a system, and communicate what the evidence supports. Agricultural problems make this process especially meaningful because technical choices can be connected to environmental stewardship, labor, productivity, and public benefit.

Teaching experience

At Penn State, I taught Strength of Materials through face-to-face lectures and laboratory instruction. At the University of Cape Coast, I supported undergraduate engineering instruction, demonstrations, grading, research, and advising. These roles strengthened my ability to explain technical concepts, guide laboratory work, and support students with different levels of prior preparation.

Concept	Laboratory	Project	Communication
BUILD THE FOUNDATION	MEASURE AND TEST	INTEGRATE A SYSTEM	EXPLAIN EVIDENCE AND LIMITS

Courses I am prepared to teach and develop

01 Artificial Intelligence in Agriculture
Computer vision, data pipelines, responsible machine learning, validation, and decision support for agricultural applications.

02 Agricultural Robotics
Perception, kinematics, control, navigation, mechatronics, field integration, and system-level evaluation.

03 Precision Agriculture Systems
Spatial data, sensing, machinery, variable-rate technologies, implementation, and performance assessment.

04 Engineering Mechanics and Design
Mechanics, material behavior, prototyping, testing, design iteration, and technical communication.

Learning design and mentoring practice

Project-based learning

I use projects to help students see how separate ideas become a working engineering system. A project should have a clear agricultural or societal purpose, measurable requirements, staged milestones, documentation, and a final explanation of results and limitations. Students learn that code, hardware, experiments, and communication are interdependent.

Mentoring philosophy

My mentoring approach combines structured independence, shared ownership, and visible progress. I help students define a meaningful problem, understand why it matters, and progressively take ownership of the decisions required to solve it.

- Use regular milestones to make ambitious work manageable.
- Treat documentation and reproducibility as core engineering practices.
- Create space for questions, iteration, and learning from failure.
- Connect each student's contribution to the complete system and public purpose.

Extension and public engagement as teaching

Field days, career events, webinars, and technology demonstrations are part of my teaching practice. I have communicated agricultural robotics to sixth-grade students, high-school students and teachers, growers, extension audiences, engineering peers, and university leadership. These experiences sharpen my ability to match an explanation to an audience and help students see communication as an engineering responsibility.

Inclusive learning environment

I aim to create a learning environment where students can ask questions freely, contribute according to their developing strengths, receive constructive feedback, and see a pathway from classroom knowledge to public benefit. Transparent expectations, multiple ways to engage with technical material, teamwork, and timely feedback help students build confidence without lowering standards.

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