Learning Engineering for Next-Generation Systems (LENS)

Engineering human capability. Advancing system performance.

Learning engineering is an emerging practice and discipline that applies the learning sciences through engineering methods and data-informed decision making to design, implement and continuously improve systems that develop human capability. Where traditional instructional design focuses on the quality of individual learning experiences, learning engineering treats capability development as a system-level problem; one that requires rigorous evidence, iterative improvement, and integration across the full lifecycle of complex systems.

Many academic programs in the learning sciences and learning engineering are organized around designed instructional contexts: schools, universities, and edtech products. These are essential domains, but they represent only a fraction of the environments where human capability development is operationally critical. In healthcare systems, defense enterprises, public infrastructure, and other high-stakes organizations, the gap between human performance and system performance is consequential, and it remains largely unaddressed by the tools and frameworks that instructional traditions provide.

LENS is built for that gap. Aligned with emerging IEEE ICICLE learning engineering standards, it prepares graduates to treat human capability not as an instructional afterthought but as a core engineering function that must be designed into complex systems from the outset and sustained across the system lifecycle. LENS graduates will operate fluently at the intersection of the learning sciences and systems engineering, able to work across the disciplinary boundaries that currently leave the human side of complex domains neglected at measurable cost to system performance.

Within the LDT program, LENS is the specialization most directly oriented toward high-stakes, operationally complex environments, including healthcare, defense, and education itself when understood as a complex system rather than a collection of instructional events. Learning engineering is emerging as a profession and academic discipline. LENS graduates will enter the workforce at a formative moment, positioned not just to practice learning engineering but to help define it.

Program Goals

1. Prepare practitioners with evidence-driven, methodological skills to instrument learning environments, analyze performance data, and produce **decision-grade evidence** linking learning outcomes to operational performance.
2. Develop analytical and professional skills to responsibly design, deploy, and improve solutions that address critical customer needs, applying implementation science and continuous improvement cycles to integrate human and system capabilities effectively.
3. Develop professionals who can navigate the requirements of complex, high-stakes environments, treating privacy, bias, ethics, and accountability as design constraints.
4. Enhance capabilities to leverage emerging technologies, including artificial intelligence, and to interpret results and risks responsibly, with attention to uncertainty and auditability.
5. Advance the learning engineering field by applying rigorous methods to authentic operational problems in coursework and capstone projects, contributing new evidence on effectiveness.

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