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This project, now in its fifth year, continues our effort to weave the principle of energy conservation throughout the undergraduate mechanical engineering curriculum. Earlier phases focused mainly on heat exchangers and thermal systems. The current stage expands the approach to connect energy concepts across several core courses, including Dynamics, Fluid Mechanics, Heat Transfer, Thermodynamics I and II, Industrial Hydraulics, Aerodynamics, and Internal Combustion Engines.

The goal is to help students see the First Law of Thermodynamics and energy balance principles not as isolated ideas, but as concepts that appear repeatedly in different engineering contexts. In Dynamics, students apply the work–energy principle to analyze motion and mechanical systems. Fluid Mechanics and Industrial Hydraulics highlight energy losses and energy transfer in flowing fluids. Thermodynamics courses emphasize energy balances in closed and open systems and the efficiency of thermodynamic cycles. Heat Transfer focuses on conduction, convection, and radiation processes, while Aerodynamics and Internal Combustion Engines extend these ideas to aerodynamic performance and the conversion of chemical energy into mechanical power.

Across these courses, students engage with the material through analytical problem solving, laboratory activities, computational analysis, and course projects. These experiences allow them to connect theory with real engineering systems.

Student learning is evaluated through assignments, lab reports, projects, and brief surveys. Over several years, results suggest that revisiting energy conservation across multiple courses helps students develop a clearer and more lasting understanding of how energy principles guide engineering analysis and design.