IMPROVING SCIENCE TEACHING & LEARNING AT FLORIDA STATE UNIVERSITY
INSTEAD OF LECTURES

Studio Physics courses rely on technology-enhanced small group learning in a dynamic and collaborative environment.
As the demand for college graduates in science, technology, engineering and mathematics (STEM) grows, Florida State University is improving the opportunities for students to enter these fields with science courses that are innovative and engaging.

FSU’s Physics faculty looked to the nation’s leading physics education researchers for the best ways to help students learn this challenging subject better. The result – FSU’s Studio Physics Program – has produced dramatic improvements in learning gains and increased access to the financially attractive STEM fields for more students.

TECHNOLOGY-ENHANCED AND COLLABORATIVE

In most universities, physics is taught in large, impersonal lecture halls where students are left to fend for themselves and in which the exciting recent research on how students learn science is ignored. In contrast, the Studio Physics Program harnesses the power of technology to make the basic laws of nature clear to students through experiments that they perform in small groups with state-of-the-art lab equipment.

Even the architecture of the classroom is optimized for learning: The room is designed to encourage social interactions among the small groups of students and instructors to drive the development of understanding.

DEMANDING AND DYNAMIC

Using frequent face-to-face encounters with students in class, instructors in Studio Physics classes can raise the bar and insist that students deepen their understanding of topics such as the nature of energy and electromagnetic effects in circuits that are critical in engineering and information technology.

Class learning gains are measured every semester, and in most cases Studio Physics students have achieved learning gains that are twice as large as those in traditional lecture courses. However, when these assessments show areas needing improvements, adjustments to the curriculum or pedagogy are implemented.

PROVEN LEARNING STRUCTURE

The model for FSU’s Studio Physics Program was developed by Professor Robert Beichner at North Carolina State University, who received the 2011 McGraw Prize in Education for this work. In addition to FSU, Beichner’s model has been adopted at other leading universities such as MIT.

TRAINING THE NEXT GENERATION OF PHYSICS TEACHERS

Physics and physical science teachers being trained at FSU take advantage of the innovative Studio Physics environment as well. Through the Learning Assistant Program, the Physics Department

“Learning physics has always been a serious obstacle to many students who wanted to become scientists and engineers. Through the Studio Physics program, we’ve helped many more students clear the hurdle of learning physics with understanding so they can successfully pursue their dreams of high tech careers.”

DR. PAUL COTTLE
STEVE EDWARDS PROFESSOR OF PHYSICS, FLORIDA STATE UNIVERSITY

and the university’s undergraduate math and science teacher education program, FSU-Teach, involve future physics teachers as assistant instructors in Studio Physics classes. In this way, these future teachers can see the power that an interactive learning environment can have when the instructors have excellent support and resources.

REPLICATING SUCCESS

Studio Physics is about building a progressive yet demanding learning environment which nevertheless provides a broader pool of students access to science and engineering careers.

With the success of its Studio Physics program now well established, Florida State University is planning to implement similar instructional reforms in other science fields.