

A Teaching Resource Package for Applied Engineering Physics Education

Background

Improving student understanding of the interdependence of science and engineering is a core goal expressed in the Next Generation Science Standards which is applicable for both high school and introductory college level students.

While published textbooks focused on the academic disciplines of engineering and physics exist, there remains an unmet need for new resources providing for new content that combines both traditional and emerging topics in these fields. In addition, resources that can be published electronically and are accompanied by e-learning tools and other digital materials are desired in an effort to enhance a student's educational experience and improve learning outcomes.

Technology

A professor of chemistry and physics at the University of Wisconsin-Stout has created a new teaching tool for use in both college and high school level engineering and/or physics education. This technology consists of a two-volume academic textbook held in electronic form, combined with a comprehensive solution manual, and accompanying digital software program.

The Applied Engineering Physics textbook is comprised of two volumes consisting of 19 chapters, 8 appendices, and 67 in-depth applications. The two volumes focus on the laws of physics and engineering statics as well as strength of materials, beams and applications, and concepts of sustainable engineering. In addition to the above-mentioned ancillary resources, this comprehensive tool comes with over 130 purpose-built student survey questions for use in the classroom.

While other textbooks exist around engineering physics, what makes this resource unique is the structured approach taken in the teaching of these topics. In addition, the textbook includes chapters on key topics not commonly found in other resources including nondestructive testing and sustainable engineering.

Research and Development Status

The textbook is fully completed, and the beta version of the software package is written and fully functional. Further development of the software component may be needed prior to commercialization. WiSys is actively seeking a commercial partner who is interested in licensing this educational resource package.

Applications and Key Benefits

- Comprehensive resource and teaching tool developed using a pragmatic approach for college and/or high school level students. Tool comprises:
 - Complete textbook available in PDF format;
 - Solutions manual available for end of chapter problem sets;
 - Student survey questions; and
 - Beta version of software tool written in Python.
- Textbook chapters focus on applied engineering physics covering both traditional as well as emerging topics such as nondestructive testing and sustainable engineering.
- End user testing conducted in college level engineering/physics course.

Intellectual Property

WiSys holds copyright protection around the Applied Engineering Physics textbook and associated ancillary materials including the educational software program. Access to all materials including the beta version of the software is available for evaluation by interested parties. For more information on partnering opportunities, please contact licensing@wisys.org.