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Contents

Strength of materials focuses on the determination of stress and deformation of transversely loaded structures and statically indeterminate structures. In this paper, we outline the topics covered in each of the two reformed courses compared to the traditional curriculum. We discuss the delivery of the design-based courses, and we show the student's and instructor's perspective of the changes.

Within the last five years, the College of Engineering at Virginia Polytechnic Institute and State University (VPI&SU) has restructured the common freshman and sophomore curriculum. In addition, the Department of Engineering Science and Mechanics (ESM) has undertaken a complete overhaul of the ESM undergraduate degree. Coupled with these events have been necessary changes in service courses such as physics, an area which has a complex overlap with the basic engineering mechanics courses. The planning process for the new ESM curriculum is reviewed in this paper. Complete listings of both the old and new curricula are included.

Rose-Hulman Institute of Technology implemented a new sophomore curriculum starting in the 1995–96 academic year. The sophomore year curriculum primarily concentrates on engineering science material that is traditionally covered in courses such as Dynamics, Thermodynamics I, Fluid Mechanics, and Circuits I. At Rose-Hulman this material has been repackaged into a new sequence of courses where the concepts of conservation and accounting permeate the courses. The purpose of this paper is to discuss how the mechanics material has been distributed throughout the curriculum and how it is taught in the framework of conservation and accounting. Assessment results will also be presented.

This paper describes an alternative method for teaching undergraduate dynamics that has been used in the Faculty of Mechanical Engineering at Technion for over twenty years. The sequence of topics in the course presents the kinematics of particles, systems of particles and rigid bodies in three dimensions before discussing the kinetics of these systems. This alternative sequence provides the students with sufficient time and practice to master the concepts of a rotating coordinate system which are essential for three-dimensional problems in dynamics. In addition, the paper presents a discussion of indicial notation and tensors, a simple proof of the formula relating the time derivative of rotating base vectors and the angular velocity vector, as well as a convenient tabular notation that helps formulate complicated problems in dynamics. Two example problems are presented to demonstrate the use of this tabular notation.

This paper describes the Mechanical Engineering contents of a new inter-disciplinary, project-based freshman engineering curriculum at New Jersey Institute of Technology (NJIT). The course, which was run as a pilot when this paper was written, is called Fundamentals of Engineering and has now been approved for the freshman engineering curriculum. The two case-study projects, which constitute the Mechanical Engineering component of the course curriculum, are the Lawn Sprinkler and 3.5-inch Floppy Disk Drive. In this course, the freshman engineering student is introduced to many aspects of engineering as an entire unit working together, with particular emphasis on the concept of teamwork in engineering research projects. Students are introduced to many computer-aided design tools available at NJIT which can be used not only to build models of the product to be manufactured but also for diagnostic analysis in order to solve potential manufacturing problems. The student is also introduced to the concept of communication among team members and the concept of technical report writing and oral presentation. The grading and course evaluation schemes are also discussed. A few samples of students' graphic communications are reproduced.