Mechanical Engineering

Mechanical engineering combines engineering physics and mathematics principles with materials science to design, analyze, manufacture, and maintain mechanical systems. The mechanical engineering field requires an understanding of core areas including mechanics, dynamics, thermodynamics, materials science, structural analysis, and electricity.

- **Book: Structural Mechanics (Wierzbicki)**

This text covers the fundamental concepts of structural mechanics with applications to marine, civil, and mechanical structures. Topics include analysis of small deflections of beams, moderately large deflections of beams, columns, cables, and shafts; elastic and plastic buckling of columns, thin walled sections and plates; exact and approximate methods; energy methods; principle of virtual work; introduction to failure analysis of structures.

- Front Matter
- 1: The Concept of Strain
- 2: The Concept of Stress, Generalized Stresses and Equilibrium
- 3: Development of Constitutive Equations of Continuum, Beams and Plates
- 4: Solution Method for Beam Deflections
5: Moderately Large Deflection Theory of Beams
6: Bending Response of Plates and Optimum Design
7: Energy Methods in Elasticity
8: Stability of Elastic Structures
9: Advanced Topic in Column Buckling
10: Buckling of Plates and Sections
11: Fundamental Concepts in Structural Plasticity
Back Matter

Thumbnail: Archimedes' screw was operated by hand and could efficiently raise water, as the animated red ball demonstrates. (CC BY-SA 2.5; Silberwolf via Wikipedia)