



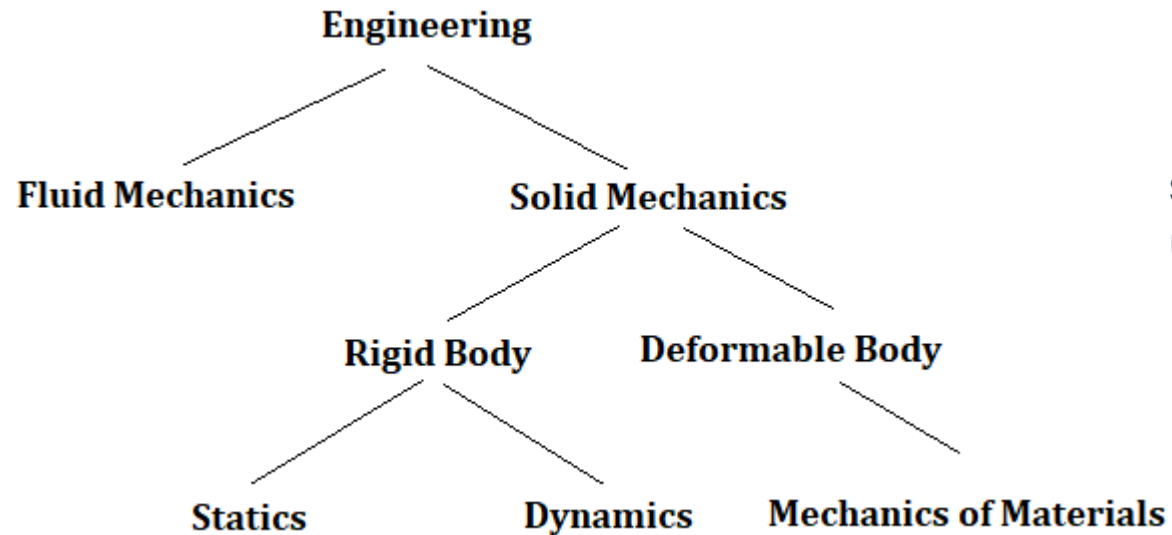
Faculty of Engineering Department of Civil Engineering

MECHANICS SUBDIVISION

Assist. Prof. Dr. Ersan GÜRAY

Fundamental Courses

- STATICS
- DYNAMICS
- MECHANICS OF MATERIALS



In mechanics, a **rigid body** is a solid body in which deformation is zero or so small it can be neglected. The distance between any two given points on a rigid body remains constant in time regardless of external forces exerted on it. A rigid body is usually considered as a continuous distribution of mass.

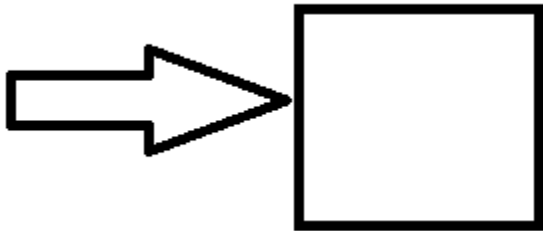
In mechanics, any body that changes its shape and/or volume while being acted upon by any kind of external force.

MECHANICS

From wikipedia:

Mechanics is the area of physics concerned with the motions of macroscopic objects.

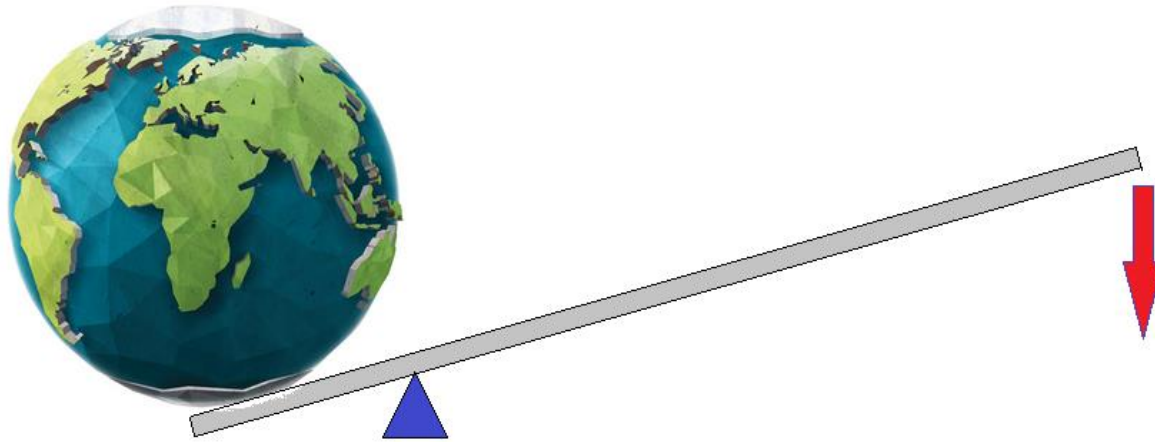
Forces applied to objects result in displacements, or changes of an object's position relative to its environment.



Origins of Mechanics

This branch of physics has its origins in Ancient Greece with the writings of Aristotle and Archimedes*

Archimedes: "Give me a lever long enough and a fulcrum on which to place it."



... Galileo, Huygens, Newton, Euler, d'Alembert, Lagrange

**A History of Mechanics*, Rene Dugas, a leading scholar and educator at the famed Ecole Polytechnique in Paris

Classical Mechanics vs. Quantum Mechanics

During the early modern period, scientists such as Galileo, Kepler, and Newton laid the foundation for what is now known as classical mechanics. It is a branch of classical physics that deals with particles that are either at rest or are moving with velocities significantly less than the speed of light. It can also be defined as a branch of science which deals with the motion of and forces on bodies not in the quantum realm. The field is today less widely understood in terms of quantum theory.

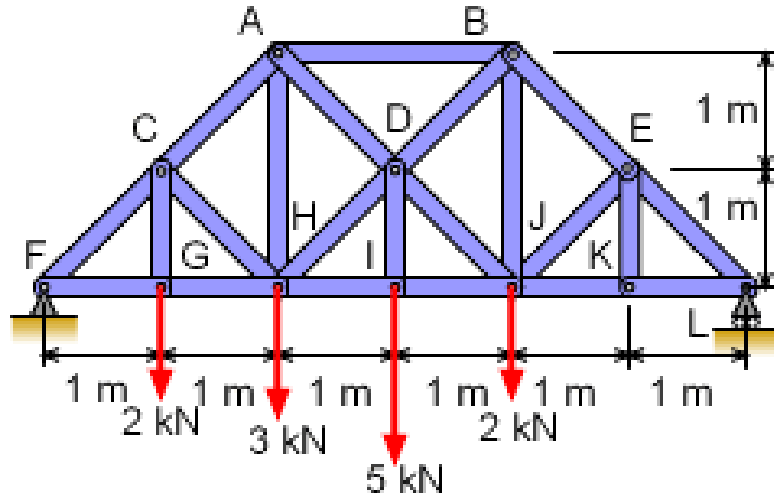
The following are described as forming classical mechanics:

- Newtonian mechanics, the original theory of motion (kinematics) and forces (dynamics).
- Analytical mechanics is a reformulation of Newtonian mechanics with an emphasis on system energy, rather than on forces.
- Classical statistical mechanics generalizes ordinary classical mechanics to consider systems in an unknown state; often used to derive thermodynamic properties.
- Celestial mechanics, the motion of bodies in space: planets, comets, stars, galaxies, etc.
- Astrodynamics, spacecraft navigation, etc.
- Solid mechanics, elasticity, plasticity, viscoelasticity exhibited by deformable solids.
- Fracture mechanics
- Acoustics, sound (= density variation propagation) in solids, fluids and gases.
- Statics, semi-rigid bodies in mechanical equilibrium
- Fluid mechanics, the motion of fluids
- Soil mechanics, mechanical behavior of soils
- Continuum mechanics, mechanics of continua (both solid and fluid)
- Hydraulics, mechanical properties of liquids
- Fluid statics, liquids in equilibrium
- Applied mechanics or Engineering mechanics
- Biomechanics, solids, fluids, etc. in biology
- Biophysics, physical processes in living organisms
- Relativistic or Einsteinian mechanics, universal gravitation.

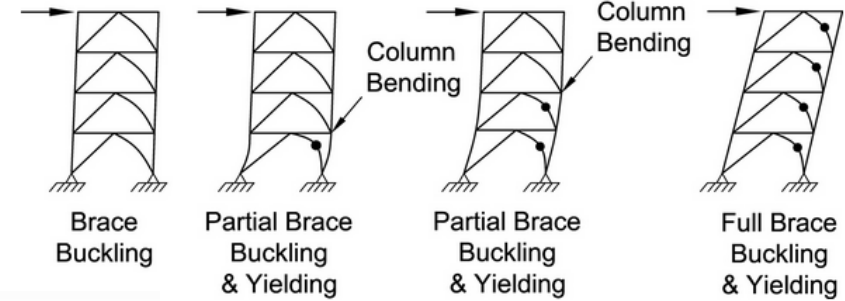
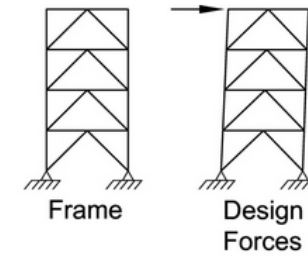
The following are categorized as being part of quantum mechanics:

- Schrödinger wave mechanics, used to describe the movements of the wave function of a single particle.
- Matrix mechanics is an alternative formulation that allows considering systems with a finite-dimensional state space.
- Quantum statistical mechanics generalizes ordinary quantum mechanics to consider systems in an unknown state; often used to derive thermodynamic properties.
- Particle physics, the motion, structure, and reactions of particles
- Nuclear physics, the motion, structure, and reactions of nuclei
- Condensed matter physics, quantum gases, solids, liquids, etc.

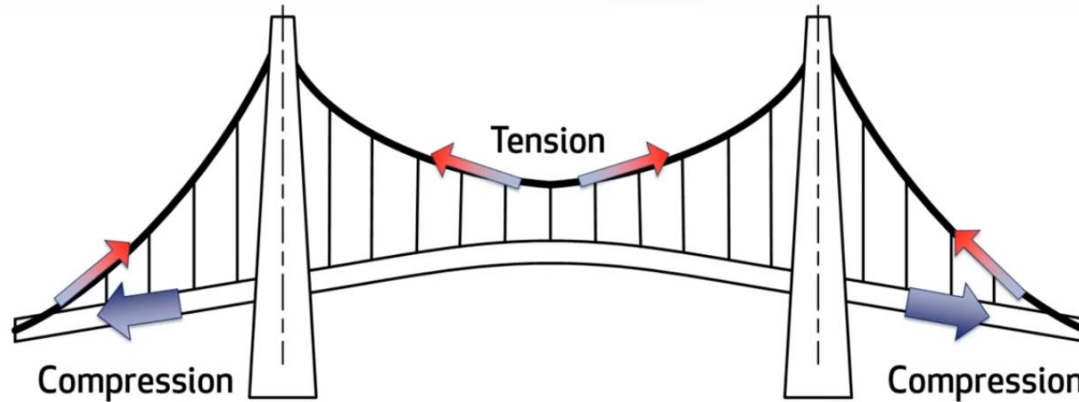
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