Summary
Understanding and modeling properties of living cells such as shape, motion and force generation in terms of fundamental laws of physics.

Content
Introduction. Spatial and temporal scales and relevant physical forces at the cellular level. Viscous drag and adhesive forces.
Overview of bioenergetics. The cell as out-of-equilibrium system. Mitochondria, transmembrane potential, proton-ATPase, and rotational electric motor of bacterial flagellum.

Keywords
cell biophysics, cell motion, cytoskeleton, traction forces, molecular motors, actin, symmetry breaking, membrane tension, transmembrane potential

Learning Prerequisites
Recommended courses
physics and mathematics at the introductory university level, general biology at the high school level

Teaching methods
Lectures, paper discussion, problem solving

Expected student activities
attending the lectures, completing exercises, reading and presenting recent papers in the field

Assessment methods
paper presentation, problem solving, oral exam

Supervision
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<th>Office hours</th>
<th>Yes</th>
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<td>Assistants</td>
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