

# The Department of Mathematics

2022–23–A term

**Course Name** Classical Mechanics 1

**Course Number** 203.1.1281

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/fall2023/courses/classical-mechanics-1>

**Office Hours** <https://www.math.bgu.ac.il/en/teaching/hours>

## Abstract

## Requirements and grading<sup>1</sup>

## Course topics

Mathematical introduction: Coordinates, vector algebra, partial derivatives. Particle kinematics: general concepts, velocity, acceleration, rotational motion. Newton's laws, Galilean relativity, inertial and non-inertial frames Particle dynamics: applications of Newton's laws, work, kinetic energy, momentum, angular momentum. Potential energy, conservation laws. Motion in a potential I: 1D potential, central forces, Keplerian motion. Motion in a potential II: Oscillations. Mathematical addition: complex numbers. Many particle systems, conservation laws, collisions. Rigid body rotation I: Theory (angular velocity and acceleration, tensor of inertia, moment of inertia, torque, angular momentum, kinetic energy). Rigid body rotation II: Applications (rolling, precession, gyroscopes). Basics of special relativity (Optional) Gravitation.

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<sup>1</sup>Information may change during the first two weeks of the term. Please consult the webpage for updates