INTRODUCTION.

The purpose of this text is to provide the students with the theoretical background and engineering applications of the two dimensional mechanics of the rigid body. It is divided into four chapters.

The first one, **Dynamic of particles**, deals with these engineering problems that can be modelled by means of limited number of particles. A large class of engineering problems falls into this category.

The second chapter, **Plane dynamics of a rigid body**, consists of two sections. The first one, *Kinematics*, deals with the geometry of motion of rigid bodies in terms of the inertial as well as in terms of the non-inertial system of coordinates. In the second section, entitled *Kinetics*, the equations that determine the relationship between motion and the forces acting on a rigid body are derived. This chapter provides bases for development of methods of modelling and analysis of the *plane mechanical systems*. Mechanical system usually refers to a number of rigid bodies connected to each other by means of the *kinematic constraints* or the *elastic elements*. The last two chapters are devoted to the engineering problems that can be approximated by the plane mechanical systems.

The third chapter, **Dynamic Analysis of Plane Mechanisms**, provides a systematic approach to the dynamics of a number of rigid bodies interconnected by the kinematic constraints. Formulation of the differential equations of motion as well as the determination of the interaction forces in the kinematic joints are covered.

Each chapter is supplied with several engineering problems. Solution to some of them are provided. Solution to the other problems should be produced by students during tutorials and in their own time.