Despite the ability to perform complex transplant for various types of organs and tissues, doctors invariably are facing with significant barriers to save life and health due to an insufficient number of donors. The emergence of new scientific fields such as tissue engineering or bionics enabled significant progress in medical practices giving more and more treatment options for people with chronic and terminal illnesses. Chitosan is a biopolymer obtained by the deacetylation of chitin. It exhibits biocompatibility, biocompatibility, biodegradability, lack of pyrogenicity and has antibacterial properties. For this reason, it is increasingly used in medicine for the production of dressings, controlled drug delivery systems and tissue engineering. This branch of science currently uses mainly 3D printing technology to receive functional substitutes of tissues and organs. 3D printing also plays an important role in enabling the creation of bionics different constructs performing biomimic functions in the body. The aim of the project is to develop an innovative technology of new thermoplastic chitosan-based bionanocompozites with semiconductive properties which would enable electrostimulation of the growing cells. The tasks apart of synthesis will include an examination of their physico-chemical and biological properties like biodegradability, bioactivity or cytotoxicity. Additionally 3D scaffolds will be printed. Moreover attempts of selected cell lines breeding on ready outprints will be performed using electrical stimulation method in order to accelerate their proliferation. The innovative biomaterial printed 3D will be used in tissue engineering as a matrix for tissue culture and organ and in bionics, where it will serve as a coating or part of various constructs of biomimetic systems e.g. nervous and blood.