ITMO UNIVERSITY

BIOMECHATRONICS

Partner University: Tallinn University of Technology (TUT), Estonia.

Language: English.

Outcome: 2 diplomas (1 from TUT, 1 from ITMO University).

Biomechatronics is a relatively new science that studies compatibility of biological organisms with mechatronic systems. This field of studies emerged due to recent development of nanotechnologies and cybernetics. Nowadays Biomechatronics becomes more and more essential for people's lives. For example, recent years saw brisk development of man-operated medical robots. Just imagine, the surgeon is staying behind the glass windows of an operating ward with a remote control device while a complex robot equipped with multiple cameras is performing a heart surgery. Impressive, isn't it?

Basic information: This study track is focused on the design of various biomechatronic systems for medical and rehabilitation purposes. Also, the students are provided with the knowledge in principles and advantages of biomimetic approach for the design of robots and mechatronic systems. During the study, students will learn basic principles of the design of biomedical devices, such as orthoses, prostheses and exoskeletons. Modelling, simulation and calculation of various features of the designed systems is also considered in this specialization.

Upon successful completion of the study, students are expected to be able to select optimal material, shape and size for mechanical parts, as well as suitable actuators, electronic components, sensors and control algorithms for the designed systems and robots.

- The students study at home university during the 1st and 2nd semesters. The 3rd semester must be taken at ITMO University for TUT students and at TUT for ITMO University students.
- Final Thesis is co-supervised by TUT and ITMO University professors or researchers in the 4th semester.
- Defense of the Final Thesis occurs in front of two universities joint defense board in English.
- In addition to the courses of the general university module, the following courses of specialization are reading

Course	**ECTS credits**
Design of Biomechanical Systems	3
Robot Sensing Systems	3
Modeling and Control in Mechatronic Systems	3
Computer Aided Design Systems	3
Microprocessor Systems	3
Biomechatronics and Biomimetics	6
Human Machine Interface	3
Programming of Robots / Object Oriented Programming	3
Materials in Biomechanical Systems	3