

Systems and Technologies in Digital Healthcare (in the field of Biomedical Engineering) (Master)

Saint Petersburg Electrotechnical University "LETI"

Degree or qualification is awarded: **Master**

Language of study: **English**

Mode of study: **full-time**

Duration: **2 years**

Availability of free education: **yes**

Price: **200 000 rubles per year**

Programme webpage at the university website:

<https://etu.ru/en/study/masters-degree/systems-and-technologies-in-digital-healthcare/>

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Students gain knowledge of bioengineering systems development in Digital Healthcare. Students develop practical work skills with modern technologies and systems for disabled patient examination, and the ability of carrying out scientific research during the development of new systems for remote health monitoring. About the program

The educational program provides training for specialists in biomedical engineering to use modern information, telecommunication and computer technologies, and telemedicine for remote monitoring and health assistance of outpatients with chronic diseases. Using the aforementioned technologies, specialists will be able to reveal the exacerbation of chronic diseases in real time and to monitor the health of patients during treatment. The formation of professional skills and competencies required for professional activities in the field of digital medicine will be carried out by developing and incorporating new disciplines into the program. These disciplines are aimed at automating the design of remote monitoring systems using artificial intelligence for processing and analysis of biomedical signals, information, and medical assistance of patients during monitoring.

Education and research facilities

Research and development of mHealth systems for early diagnosis and remote health state monitoring.

Intelligent processing of data and signals (ECG, EEG, Respiratory waves), including methods of preprocessing, methods of pattern recognition, and inference methods. New algorithms and programs for intelligent diagnostic and monitoring medical equipment.

Foot scanning analysis during static position and dynamic movement, computer postural assessment and analysis of the body in static position.

Clinical gait analysis of kinematic (angular movement of body segments and joints), kinetic (movement, powers and ground reaction forces) and muscle function (electromyography, muscle-tendon lengths, forces and their velocities) data and statistical interpretation of upper and lower body movements.

Construction of biological objects, prosthesis, implants models with the health state research. Master students carry out individual professionally-oriented work, scientific research and a thesis at leading medical centers in Saint Petersburg, such as:

Federal Almazov Medical Research Center (St. Petersburg)

Federal State Budgetary Scientific Institution "Institute of Experimental Medicine"(FSBSI "IEM")

Federal Scientific Center of Rehabilitation of the Disabled named after G.A. Albrecht» of the Ministry of Labour and

Education and research processes are conducted on the basis of the modern electronic laboratory ProLab CDIO.

The CDIO is an innovative educational framework for producing the next generation of engineers. The framework provides students with an education stressing engineering fundamental set in the context of Conceiving — Designing — Implementing — Operating (CDIO) real-world systems and products.

Additional educational opportunities

To support foreign students, the department organizes summer and winter educational schools. These schools aim to help our students with understanding "how" and "why" the Biomedical Engineering program works. Through lab experiments and detailed lessons, our students will acquire and/or upgrade their understanding of developing biomedical devices, and the application of basic scientific principles to adapt to the data from these devices.

Online courses

In 2018 a new English-language course "The Development of Mobile Health Monitoring Systems" was published on the online learning platform "Coursera". The course was introduced by the Biotechnical Systems and Technologies Department and aims to provide students with the ability to apply knowledge from various fields of science including electronics, data science and mathematics when developing the hardware and software components of medical devices. Interested students can register at platform Coursera.

Specializations within this programme

Bioengineering Systems and Technologies for Prosthetics and Rehabilitation

This master program allows students to receive qualification in the field of development and operation of technical means of medical aftertreatment, lost functions of organs and systems of the person. During this course of training the student gains skills of development of methods and technical means of medical aftertreatment of a person, projection and designing of technical means of medical aftertreatment of lost functions of organs and systems of a person, studies technological processes of medical aftertreatment, mathematical models of objects of aftertreatment and prosthetics, modern program and information support for automation of projection of technical means of medical aftertreatment.