

Goals of the Graduate School of Biomedical Science and Engineering

The Graduate School of Biomedical Science and Engineering features a new disciplinary direction integrating the biomedical science and engineering fields, aiming to apply the development of science and engineering to medical science, under the four basic principles adhered to by Hokkaido University: Frontier Spirit, Global Perspectives, All-round Education, and Practical Learning.

Biomedical Science and Engineering is a new field that aims to elucidate biological phenomena, overcome diseases, and promote the health of humans by utilizing knowledge and technology obtained in science and engineering.

Our Educational Goals Include Training for the Following Professionals:

- Professionals who will contribute to the sustainable development of human society with high-level specialty knowledge and an outstanding ethical perspective
- Professionals who will accommodate advances and internationalization in developing medical technology and equipment with extensive knowledge and strong research abilities

To Achieve Our Educational Goals, We Have Established the Following Two Courses:

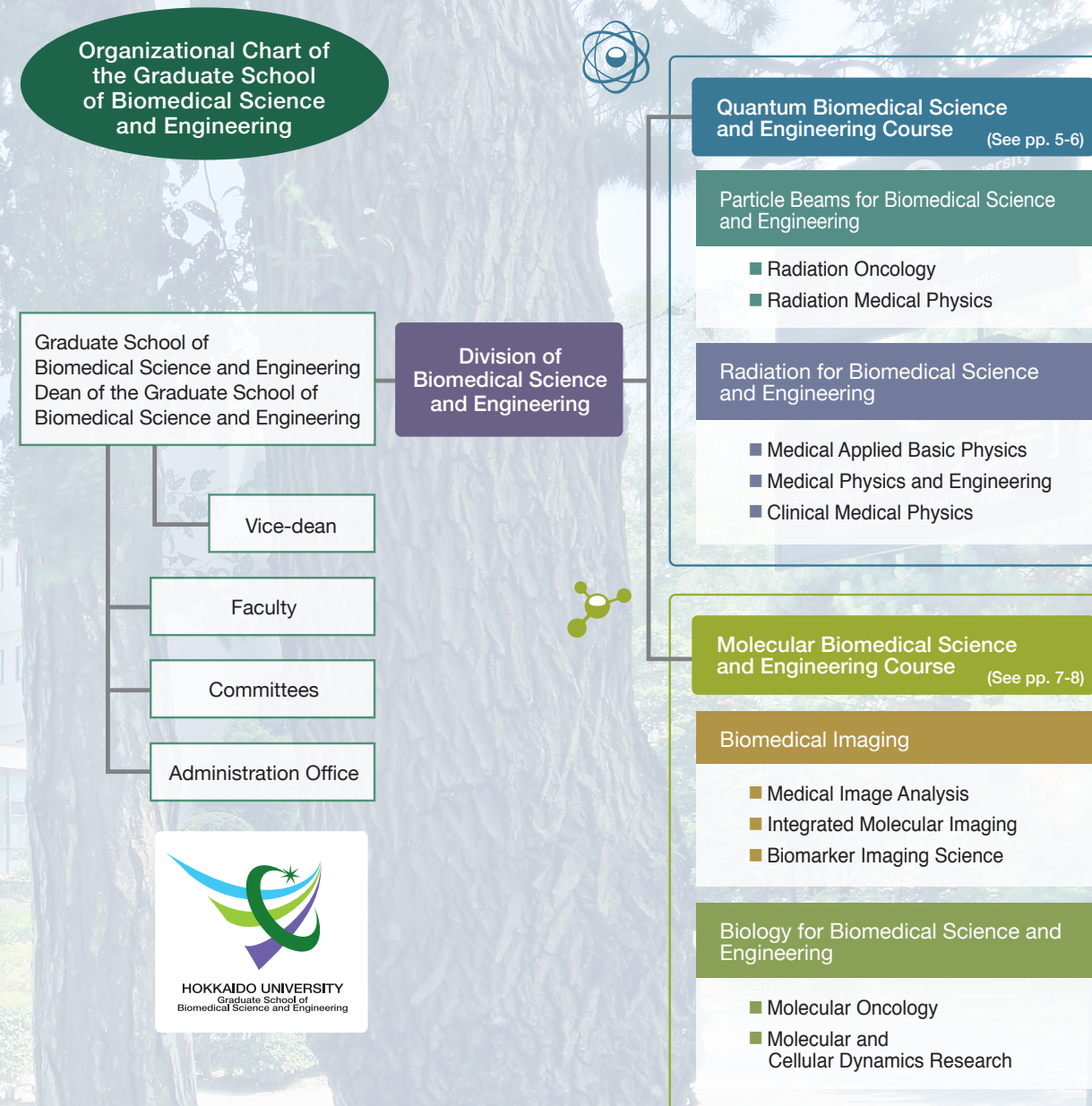
- **Quantum Biomedical Science and Engineering Course**
offering an opportunity to acquire a thorough knowledge as needed to apply basic radiation physics developed from quantum mechanics to medical science
- **Molecular Biomedical Science and Engineering Course**
offering an opportunity to acquire a thorough knowledge as needed to apply science and engineering to *in vivo* molecules in medical science

In both courses, you can expect an innovative integrated education for the basic knowledge and skills in the fields of science and engineering as well as a basic education in medicine and medical ethics, systematically provided by all the members of the graduate school faculty.

Our Ideas for What Kind of Students We Wish to Enroll

We expect to enroll students who have strong interests in and curiosity about “biomedical science and engineering” as well as in the fields that form the basics of the courses (science, engineering, and medicine) and who are equipped with the solid educational foundations required for studies here. The students are also assumed to have aspirations to sincerely devote themselves to research by utilizing the knowledge and skills they acquire here, and work to contribute to the sustainable development of human society as specialists in biomedical science and engineering.

Organizational Chart of the Graduate School of Biomedical Science and Engineering



Message from the Dean



Dean of the Graduate School of Biomedical Science and Engineering, Hokkaido University

KUGE Yuji

Biomedical science and engineering is an academic discipline to elucidate life phenomena, overcome diseases, and improve human health by utilizing the knowledge and technology of science and engineering in medicine. The Graduate School of Biomedical Science and Engineering at Hokkaido University was established on April 1, 2017 with the aim of developing professionals capable of practicing biomedical science and engineering. The graduate school is comprised of (1) the Quantum Biomedical Science and Engineering Course to develop professionals who can apply specialized knowledge and skills of radiotherapy and particle beam therapy and related medical equipment to medicine, and (2) the Molecular Biomedical Science and Engineering Course to develop professionals who can apply specialized knowledge and skills of analysis and diagnostic imaging of *in vivo* molecular behavior to medicine.

Medical progress can only be achieved by combining not only the results of medical research but also the results of various studies in science, engineering and other fields with the development of science and technology. Needless to say, radiology requires engineering research and the development of radiodiagnosis and radiotherapy equipment. Nuclear medicine diagnostic imaging, including PET examinations, also requires engineering research on diagnostic imaging equipment as well as many physical and chemical studies such as nuclear physics/chemistry related to the production of radionuclides and synthetic chemistry/pharmacy related to the production of radiopharmaceuticals. Faculty members in a variety of research fields, including not only medical fields specializing in radiology but also science fields specializing in nuclear physics, molecular biology, radiobiology and pharmaceutical science, and engineering fields specializing

in radiodiagnosis and radiotherapy equipment are involved in the educational and research activities at this graduate school. I believe this is the best environment for engaging in biomedical science and engineering education and research, which is focused on utilizing the knowledge and skills of science and engineering in medicine to elucidate life phenomena, overcome diseases, and improve human health.

I hope students who have studied biomedical science and engineering at this graduate school will play a leading role in Japan and the world as well as contribute to society and medical care through research on cutting-edge science and engineering applied to medicine, and development research of new medical technology and equipment. We look forward to your continued support and encouragement.