DESCRIPTION OF GRADUATE SCHOOL PROGRAM

*Majors and courses open to the application need to be confirmed through each application guidelines.*The English translations are provided only for reference purposes to aid in the understanding of the Japanese originals. In the case of a discrepancy between the Japanese original and its English translation, the former shall take precedence.

1. OBJECTIVE AND MISSION

Ⅰ Master's Program in Medical Sciences

Aims at cultivating researchers and educators in medical sciences, and human resources with expertise in medical sciences who can respond to industrial needs in the field of medical sciences.

Ⅱ Master's Program in Disability Sciences

For students who graduated in an area other than medical-related such as physical education, liberal arts and engineering, aims at cultivating human resources including researchers, teachers, and administrative officials who can make international contributions. For medical specialists such as physical therapists, occupational therapists, and speech therapists, aims at cultivating of leaders such as teachers who can take charge of graduate school education for medical related occupations or who can perform specialized medical rehabilitation.

Ⅲ Master's Program in Health Sciences

While forming the research and educational base at a global level on health science, aims at contributing to the maintenance and improvement of health as a right of human beings in an advanced welfare society. Accordingly aims at cultivating researchers and educators in health sciences, and advanced medical professionals.

Ⅳ Master's Program in School of Public Health

Aims at formulating the education-research center of public health at the world's best standard, and aims at contributing to an advancement of health and welfare for people in Japan as well as all over the world. Aims at training researchers, professionals and leaders, who have a broad background of public health and a high standard of job specialty and ethics.

Ⅴ Medical Sciences

The main objective of our Graduate School is to train medical researchers to achieve a high standard of independent research activities. With their acquisition of superior research skills and the necessary fundamental knowledge, they will eventually be able to contribute to the development of medicine and improve the welfare of society.

Ⅵ Disability Sciences

The Doctoral Program of the Disability Sciences Integrated Master's and Doctoral Program aims to train human resources to acquire abilities enabling them to perform independent research activities or to be engaged in medical rehabilitation work, and to contribute to the international society.

Ⅶ Health Sciences

The Doctoral Program of the Health Sciences Integrated Master's and Doctoral Program aims to train human resources to be professionals in health and nursing sciences, and perform research activities independently as researchers/educators or play an active part in research at a clinical site, enterprise, etc. as a leader in the front lines.

2. COURSE OF STUDY AND CURRICULUM

In order to complete the master's programs and receive a degree,

students must enroll in the program for two years or longer, and take a predetermined course of studies to acquire 30 credits or more, and have the necessary research supervision, complete a master's thesis and pass the final examination.

I Master's Program in Medical Sciences
Master's degree (Medical Sciences)
II Master's Program in Disability Sciences
Master's degree (Disability Sciences)
III Master's Program in Health Sciences
Course of Nursing Master's degree (Nursing)
Course of Radiological Technology Master's degree (Health sciences)
Course of Medical Laboratory Science Master's degree (Health sciences)
IV Master's Program in School of Public Health
Master's degree (School of Public Health)
V Medical Sciences

To complete a course of study at our graduate school, students must be enrolled for at least four years and attain 30 or more credits in fundamental knowledge lecture courses, training courses in experimental skills and advanced lecture courses. Also, students will receive the necessary research guidance so that they may complete a doctoral dissertation and successfully pass the review and final examination.

However, students who have acquired the necessary credits and been highly evaluated for their achievements by the Graduate Research Review Committee may complete the course in three or more years.

Those who complete Doctoral Program in Medical Sciences are granted the degrees:

Medical Sciences Doctoral degree (Medical Sciences)

VI Disability Sciences

To complete a course of study in the Integrated Master's and Doctoral Program (Doctoral Program), Disability Sciences at our graduate school, students must be enrolled for at least three years and attain 16 or more credits, 8 credits or more from core and 8 credits from elective subjects. Also, students will receive the necessary research guidance so that they may complete a doctoral dissertation and successfully pass the review and final examination and earn a degree.

However, students who have acquired the necessary credits and been highly evaluated for their achievements by the Graduate Research Review Committee may complete the course in one or more years (for those who have completed the master's program in less than two years of attendance at the graduate school, a period of three years in total is required).

Those who complete the Integrated Master's and Doctoral Program (Doctoral Program) in Disability Sciences are granted the degrees:

Disability Sciences Doctoral degree (Disability Sciences)

Ⅶ Health Sciences

To complete a course of study in the Doctoral Program, Health Sciences at our graduate school, students must be enrolled for at least three years and attain 16 or more credits, 8 credits or more from common and 8 credits from specialized subjects. Also, students will receive the necessary research guidance so that they may complete a doctoral dissertation and successfully pass the review and final examination and earn a degree. However, students who have acquired the necessary credits and been highly evaluated for their achievements by the Graduate Research Review Committee may complete the course in one or more years (for those who have completed the master's program in less than two years of attendance at the graduate school, a period of three years in total is required).
Those who complete the Integrated Master's and Doctoral Program (Doctoral Program) in Health Sciences are granted the degrees:

Health Sciences
Nursing Course Doctoral degree (Nursing)
Radiological Course Doctoral degree (Health Sciences)
Medical Laboratory Science Course Doctoral degree (Health Sciences)

3. RESEARCH SUPERVISION

All students who are admitted into the graduate program will be given research guidance in accordance with the research themes of the departments the students belong to.
Please refer to the Tohoku University Graduate School of Medicine website.
List of departments https://www.med.tohoku.ac.jp/english/about/laboratory/

(Explanatory Note)
Departments indicated with "※" will not be recruiting students at this time. If you have any questions about these departments, please contact the Graduate Academic Affairs Section.

4. ENTRANCE FEE/TUITION EXEMPTIONS

(1) Exemption of Entrance Fee
Students recognized as being in severe financial difficulties are eligible to apply for exemption from payment of the admission fee (complete or part exemption).

(2) Exemption of Tuition
Students recognized as being in severe financial difficulties are eligible to apply for tuition exemption (complete, part exemption) if they have an excellent academic record.

*Please refer to the Tohoku University website "The application for admission fee waiver" and "The application for tuition fee waiver".
https://www2.he.tohoku.ac.jp/menjo/

5. INTRODUCTION OF THE PROGRAMS

I Introduction to Medical Sciences Master's Programs

Goals and distinctive features

The goals are to raise educators and researchers who can contribute to the development of medicine and medical fields in Japan and international society, and to foster advanced medical professionals who will help realize safe and healthy society, where people can live in relief even when they are sick. To achieve the goals, we address bringing up people who have wide knowledge, flexible ideas, advanced information processing ability, a noble-minded sense of ethics, and practical techniques, unifying basic and clinical medicine education, Especially, the curriculum is composed so that even if the student is a graduate from other than faculty of medicine or related to medicine, he or she can harness the accumulated knowledge and skills, and develop it in the medicine and medical fields.

(1)General

Course Features

Many faculty members in the Graduate School of Medicine are available for guidance. The Graduate School of Medicine has faculty members in all fields related to medicine and medical care. It is possible to learn how to solve problems from a medical point of view from such faculty and to apply what you have learned in your undergraduate education to medicine and medicine. In order to be able to take a bird's eye view of medicine from multiple perspectives, multiple faculty members are in charge of advising papers.

Contents of Education

The curriculum is designed so that students can have a diverse and organic knowledge and practical techniques on basic and clinical medicine, and can determine their way after graduation according to their ability and direction. The students can broadly choose their carrier options.

The curriculum is divided into the following three subjects.

Career Plans after Graduation

・Entrance into the Graduate School of Medicine, Department of Medical Sciences (Doctoral Program).

・Employment at medical treatment and pharmaceutical institutions, and food-related and medical equipment development companies, and public offices (especially medical-related), etc.

・By occupation, they are a medicine researcher, biostatistician, clinical research coordinator, people responsible for medical information, clinical psychologist, psycho oncology specialist, etc.

(2) International Course of “Public Health Science for Human Security”

Course Features

After the cold was ceased in the early 1990’s, the concept of “Human Security” has become the primary common concern of international society. The new concept addresses the issues of security of “people”, instead of “nations”, such as illnesses, disasters, poverty, conflicts and so forth. Particularly in developing countries such as some nations in Asia, people’s lives and dignity have been threatened by diseases and injuries which are

basically not curable because of poverty, natural disasters, poor environmental hygiene, malnutrition and so on. In addition, epidemics and environmental pollution jeopardize human security by crossing border perspectives based on interdisciplinary views and scientific knowledge.
The International Course of "Public Health Science for Human Security" is designed to develop students' comprehension of the closely related factors which affect peoples' lives and also their ability to produce solutions, by integrating the latest knowledge of medical science and international health with the method of the humanities and social sciences. The course further aims to nurture researchers and public health leaders in international society who will contribute to the realization of human security by taking leadership in solving security problems in public health.
This course is based on the "International Post-Graduate in Human Security," and is conducted in collaboration with three other graduate schools (Agricultural Science, International Cultural Studies and Environmental Studies), from among which students may select elective courses. All elective and obligatory courses are lectured in English.

Contents of Education
Special Lectures on Human Security A,B, etc.

Career Plans after Graduation
Entrance into the Graduate School of Medicine, Department of Medical Sciences (Doctoral Program).
public offices (especially medical-related), etc

(3) Quantum biology and molecular imaging educational course
Course Features
Molecular imaging examines behaviors of in-vivo biological systems including genes and proteins. It is involved with new boundary/interdisciplinary areas of medicine, pharmaceutical sciences and engineering. Molecular imaging uses positron emission tomography (PET), magnetic resonance imaging (MRI), optical imaging, etc. Molecular imaging allows viewing changes of biological systems on a molecular base and understanding them dynamically and quantitatively. It is anticipated as a measure to diagnose cancer and dementia such as Alzheimer's disease in a very early stage.
To establish an extremely early diagnosis method based on molecular imaging, there are various technological challenges, e.g., developing equipment and devices in an engineering area, molecular probes in an area of pharmaceutical sciences, and diagnostic modalities in areas of medicine and dentistry.
The course on "molecular imaging" deals with research and education relating to molecular imaging. It targets developing advanced diagnostic modalities by integrating molecular imaging with up-to-date science and technology through not only advanced medicine including radiology, nuclear medicine, pharmacology, oncology, psychiatry, etc., but also through interdisciplinary approaches in the fields of pharmaceutical sciences, engineering and dentistry.
Some programs of this course are conducted in collaboration with the National Institute of Radiological Sciences (NIRS).

Contents of Education
As in the general course, Medical Ethics, Exercise of Research Design, Rotation Training, Internship Training, Examination in Interval, and Thesis Research are required. In addition, this course requires Advanced

Molecular Imaging I and II, and offers courses in the Molecular Medical Science Program.

Career Plans after Graduation
Entrance into the Graduate School of Medicine, Department of Medical Sciences (Doctoral Program).
Employment at medical treatment and pharmaceutical institutions, and food-related and medical equipment development companies, etc.

(4) Medical Physicists Training Course
Course Features
Advanced large medical machines are used in areas of diagnostic radiology and radiation therapy. Medical physicists are involved in the development of new instrumentation and technology for use in such fields and in the accurate measurement of the radiation output from radiation sources employed in cancer therapy to contribute clinical and scientific advice and resources to solve the numerous and diverse problems that arise continually in many specialized medical areas. Medical physicists are required to get credits in medicine, physics and clinical experience. Graduates of the Department of Radiation Technology in the Health Science Course and those of the Physical or Engineering Faculty are entered into this course. Medical physicists trained in research, education and medical treatment as team members with other medical specialists are trained.

Contents of Education
As in the general course, medical ethics, research planning practice, rotation practice, internship practice, mid-term examination, and thesis research are compulsory. In this course, students are required to take Introduction to Molecular Imaging I and II as well as the Molecular Medical Science Program.

Career Plans after Graduation
Entrance into the Graduate School of Medicine, Department of Medical Sciences (Doctoral Program).
Medical, pharmaceutical, and food-related companies, medical equipment development companies, and governmental agencies (especially in the medical field), etc.
University hospitals, public hospitals, etc.

(5) Disaster Medicine and Health Care Course
Course Features
This course is designed to provide the opportunity to scientifically study disaster medicine and health care during and after disasters, such as earthquakes, tsunamis, pandemics, and disasters involving chemical agents, biological agents, radiation/nuclear attacks, or explosives (CBRNE). This course is open mainly to nurses, pharmacists, medical administrative officers, and other medical professionals. Students in this course not only acquire knowledge of disaster-related medical and scientific issues, but also the ability to conduct research related to disaster and humanitarian response through the acquisition of a master degree of medical sciences. This course is designed mainly for Japanese students and is taught only in Japanese.

Educational Content

Disaster medicine and health care seminar, disaster medicine and health care training, disaster sciences

Career Plans after Graduation
An enhanced career in students' respective medical professions
Entrance into doctoral programs in medicine and medical sciences

(6)Basic Medicine　(the course by English for students studying abroad)
Course Features
The purpose of this course is instructions of fundamental knowledge and skills of medicine and medical sciences.
Education including every lecture and direction of thesis is conducted in English.
Many lecturers belong to Graduate School of Medicine. Their professional territories cover all aspect of medical research. They instruct students how to learn problem solution approaches through the position of medicine, as well as to expand what students have learned to medical field. Two professors are assigned for thesis advisers for developing diversified mindset.

Contents of Education
Education of this course is comprised of two parts, lectures (including classroom lectures and practical training) and writing a thesis.
At classroom, students learn basic medical knowledge and technique. At practical training, students are able to visit different laboratories to learn more about method for medical research. There are chances to present research results at the midpoint to take advises.

Career Plans after Graduation
・Advancement to doctoral course
・Company related to medical service, drug discovery, food. Public office, especially related to medicine.
・Researchers about medicine or pharmacology. Developers or person in charge of quality control at pharmaceutical company, food company etc.

Ⅱ Introduction Disability Sciences Master's Programs

Course Features

As technology advances and develops, current healthcare enables life prolongation of patients with refractory diseases. However, the number of people with physical/cognitive dysfunctions is rapidly increasing, and such patients suffer from complicated/multiple disabilities. In this situation, rehabilitation is required to cope with a large variety of diseases, and its methods and roles are changing. Rehabilitation needs new ideas from different viewpoints. Aiming to increase and develop human resources with higher levels of knowledge and rich humanity who can respond to complicated/multiple disabilities, we need to establish an interdisciplinary scientific field incorporating conventional rehabilitation medicine.

In this department, we make efforts to respond to social needs so that those with disabilities can achieve functional recovery, reduced need of nursing care, social rehabilitation and resettlement. We also attempt to explore new treatment, rehabilitation and nursing care techniques and establish new healthcare systems including analysis, assessment and prevention of various disabilities. In order to attain these goals, we introduce medicine & science in sports & exercise, physical engineering, neuroscience, neuropsychology, epileptology, behavioral medicine, musical acoustic medicine, and biomechatronics into conventional rehabilitation medicine, in order to unify the basic and clinical fields. In this manner, we promote a wider range of educational/research activities.

The educational distinction is to give graduate school education on "disability sciences" to the following students:

those who graduate from specialized areas other than medical fields such as gymnastics, pharmacology, life science, agricultural science, health science, nursing, nutritional science, psychology, education, liberal arts, engineering, music etc.

those who work as healthcare professionals such as physiotherapists, occupational therapists, speech therapists, clinical laboratory technicians and nurses, and music therapists.

Since its establishment in 1994, this department has been positioned as the only department of disability sciences among the medical research courses of graduate schools in Japan. In this department, researchers have been consistently engaged in various scientific programs focusing on the identification of causes of physical/cognitive dysfunctions, prevention of disabilities and rehabilitation.

We aim to develop human resources that can continue to promote research activities independently and contribute to international society by learning new disability sciences, receiving rehabilitation education, and accumulating the ability needed for the provision of healthcare. In this department, we promote research activities aimed at developing the confidence of researchers/instructors/administrators who are familiar with these fields and senior instructors who can provide professional rehabilitation.

Contents of Education

Introduction and training of Medicine and Science in Sports and Exercise, Behavioral Medicine, Physical Medicine and Rehabilitation, Restorative Neuromuscular Rehabilitation, Epileptology, Disability Science, Behavioral Neurology and Cognitive Neuroscience, Fetal Pathology, etc.

Career Plans after Graduation

The employment opportunities for the graduates are satisfactory because our

globally unique research activities focusing on disability sciences perfectly match current social needs. Many seniors have already been engaged in various professional fields and have played important roles in universities and research institutes in Japan and foreign countries.

(1) Researcher of disability sciences
(2) Educator/leader of disability sciences
(3) Researchers of neuroscience and medical science
(4) 4-year university teaching staff for medical related occupations (physical therapist, occupational therapist, nurse, etc.)
(5) Administrative official who has professional expertise in disability sciences
(6) Pharmaceutical companies, general companies, public servants

Ⅲ Introduction Health Sciences Master's Programs

The students aim to be advanced professionals, and educators and researchers. We accept students from other fields as well as graduates from the health sciences fields.

There are many students from the workforce entering this Department, and we support them with such as long-term learning, lectures at night and seminars. There is a way to qualify to take the entrance examination by the preliminary review prior to the graduate school examination for those who graduate from a medical junior college and have work experience.

The Department of Health Sciences is divided into three courses by the curriculum.

For completion, the student must obtain 30 credits in core and elective subjects in lectures and master's thesis preparation (thesis research).

In each course, the student must acquire more than two credits from the common elective subjects including the subjects specified in each course.
Thesis research is ten credits. Select the field to major in and the instructor for the thesis. The remaining credits are acquired from the special subjects in each field. Students of the nursing course need to acquire more than eight credits and those of the radiological technology course and the Medical Laboratory Science course need to acquire more than ten credits.

(1)Nursing Course:
①General
Course Features
The General Nursing Course is divided into the two domains of Advanced Nursing Practice and Health Development Nursing, and Family Nursing, which are then subdivided into the 12 specialties of Science of Nursing Practice, Nursing Education and Administration, Gerontological and Home Healthcare Nursing, Nursing Science of Community Health Care System, Community Health, Public Health Nursing, Adult Health Nursing, Oncology Nursing, Palliative Nursing, Child Health Nursing, Psychiatric Nursing, Department of Women's Health Nursing & Midwifery. Advanced Nursing Practice and Health Development Nursing is the domain for research and education on development and assessment of nursing skills, construction of nursing theory needed for promoting public health and supporting independent life, management of nursing education, the establishment of nursing ethics, promotion of the individual, group and community health. Family Nursing is the domain for research and education on the methods for retaining, improving and supporting the family function on the basis of family unit as the target of nursing and the

properties and life events of the family unit. Access our website, etc. for the research detailed research in each field. Students who have nurse licenses and aim to be certified nurse specialists, can study through the curriculums of oncology nursing and pediatric nursing.

Contents of Education
Nursing Research Methodology, Nursing Science, Medical Ethics, Nursing Ethics, Medical and Nursing Policy, Medical Education, Statistics for Nursing Research, Medical Statistics, etc.

Career Plans after Graduation
・Enter the Doctoral Program of Graduate School of Medicine, or other Department or doctoral programs in other university
・Teachers at universities

・Health nurse, birth attendant, nurse, clinical radiologist, clinical laboratory technologist at a university hospital or public hospital

②Course of Public Health Nurse Training
Course Features
The qualifications and skills required for a public health nurse working in local communities change with each generation. In the present day where health issues are becoming increasingly complex as our lifestyles and values are more diversified, public health nurses need to have even more advanced practical and research skills to analyze the factors of these issues from their relation with society and the environment, and endeavor to resolve and improve them with the cooperation of local residents and professional groups. Also required is the capability to work as a high-level professional demonstrating leadership in carrying out support activities for disaster-affected areas of the Tohoku coastal region. From April 2014, Tohoku University is offering a Public Health Nurse Training Course in the Graduate School Doctor of Health Sciences Course (first term two-year program) for people aiming to become public health nurses or who want to improve their skills as public health nurses.

Contents of Education
Public health nursing, community care system nursing, epidemiology, health statistics, public philosophy, practical training (administration, school, industry), problem research, etc.

Career Plans after Graduation
・Enter the Doctoral Program of Graduate School of Medicine, or other Department or doctoral programs in other university
・As a public health nurse, the local public body (health and medical welfare administrative organization)

(2)Radiological Technology Course:
①General
Course Features
The Radiological Technology Course is divided into two domains of Fundamental Radiological Science and Clinical Radiological Science, which are subdivided into seven specialties of Noninvasive Diagnostic Imaging, Radiological Imaging and Informatics, Clinical Radiological Science, Diagnostic Image Processing, Diagnostic Image Analysis, Radiological Examination and Technology, and Therapeutic Radiology. Fundamental Radiological Science promotes the basic and applied research

required to develop diagnostic imaging device, medical treatment equipment, and their applied technologies. Clinical Radiological Science is the domain to research and educate on broad diagnostic technologies used for various clinical diagnostic imaging, nuclear medicine technologies as functional diagnosis, quality control and assurance in radiodiagnosis and radiotherapy, and medical physics of a radiotherapy planning system, oncology, and radiobiology. Refer to the Website, etc. for detailed research in each field. Students aim to be a medical physicist, can learn by the curriculum centering on therapeutic radiology.

Contents of Education
In the common elective courses, students learn a wide range of specialized knowledge in medicine and health science. Also, Students can take more specialized courses such as Advanced Medical Physics, Advanced Image Informatics, Advanced Medical Image Engineering, Advanced Image Diagnostics, Advanced Image Analysis, Radiology, and Radiotherapy, as well as more clinical training in diagnostic imaging techniques and radiology. In thesis research, students will receive research guidance from the faculty member in charge and compile a master's degree thesis to acquire professional research skills.

Career Plans after Graduation
・Enter the Doctoral Program of Graduate School of Medicine, or other Department or doctoral programs in other university
・Teachers at universities
・Clinical radiologist, at a university hospital or public hospital
・Engineer at a local public body or pharmaceutical company

②Medical Physicists Training Course
Course Features
Advanced large medical machines are used in areas of diagnostic radiology and radiation therapy. Medical physicists are involved in the development of new instrumentation and technology for use in such fields and in the accurate measurement of the radiation output from radiation sources employed in cancer therapy to contribute clinical and scientific advice and resources to solve the numerous and diverse problems that arise continually in many specialized medical areas. Medical physicists are required to get credits in medicine, physics and clinical experience. Graduates of the Department of Radiation Technology in the Health Science Course and those of the Physical or Engineering Faculty are entered into this course. Medical physicists trained in research, education and medical treatment as team members with other medical specialists are trained.

Contents of Education
Students who graduated from the Department of Health Sciences are required to take courses in science and technology, and students who graduated from the Department of Science and Technology are required to take courses in medicine and health sciences. Upon completion of the course, students of both ethnic backgrounds will be able to take the same amount of courses.

Career Plans after Graduation
・Clinical radiologist, at a university hospital or public hospital

(3)Medical Laboratory Science Course:
Course Features
The Medical Laboratory Science Course is divided into two domains of Laboratory Medicine and Science, and Laboratory Medicine and Clinical Science, which are subdivided into seven specialties of Molecular and Functional Dynamics, Medical

Microbiology, Mycology and Immunology, Endocrinology and Applied Medical Science, Pathology and Histotechnology, Clinical Physiology, Molecular Hematology, and Pathophysiology. Laboratory Medicine and Science is the domain for fundamental research and education for laboratory medicine and science including basic research in the areas of molecular biology, molecular genetics, analytical chemistry, infection and immunity, endocrinology and metabolism, and applied research that lays emphasis on basic research.
Laboratory Medicine and Clinical Science is the domain especially for advanced research and education aiming at clinical applications in areas that meet more clinical settings such as pathology and histotechnology, clinical physiology, pathophysiology. Refer to the website, etc. for detailed research in each field.

Contents of Education
It consists of seminars I and II in each field for the acquisition of research ability and expertise, special lectures and experimental training for the acquisition of experimental techniques.

Career Plans after Graduation
・Enter the Doctoral Program of Graduate School of Medicine, or other Department or doctoral programs in other university
・Teachers at universities
・Clinical laboratory technologist at a university hospital or public hospital
・Engineer at a local public body or pharmaceutical company

Ⅳ Introduction to the School of Public Health Master's Program

Course Features
Health issues are becoming more diverse and complex, and genomic science is making rapid progress. On the other hand, there is a shortage of human resources to promote advanced clinical research. Under these circumstances, there is an urgent need to develop human resources who have the skills to understand and solve individual health problems from the perspective of the social environment and a sense of mission to achieve better health for both individuals and society - a background in public health. The Department of Public Health aims to contribute to the improvement of the health and welfare of people in Japan and around the world by forming an educational and research center of the world's highest standards in public health. The department aims to train researchers with a background in public health and a high level of professionalism and professional ethics, as well as leaders and practitioners, especially leading-edge interdisciplinary researchers in public health.
In the School of Public Health, we have two divisions, Information Health Medicine and Public Health Medicine, with eight full-time department and several collaborative department. Information and Health Medicine consists of four dedicated department (Epidemiology, Biostatistics, Medical Informatics and Medical Genetics) and two collaborative department (Disaster Public Health, from International Research Institute of Disaster Science (IRIDeS), and Personalized Prevention and Epidemiology). The Public Health Medicine Division consists of four dedicated department (Health Administration and Policy, Environmental Medicine and Molecular Toxicology, Forensic Medicine and Medical Ethics) and from 2017, the Department of International Cooperation for Disaster Medicine and Disaster Psychiatry were newly added from IRIDeS.
In this department, the seven courses described below are designed to develop human resources. Students will pursue advanced expertise in a wide range of fields by integrating lectures and exercises in fields related to public health and collaborating with other fields. We also provide practical education in the

disaster areas, university hospitals, and Tohoku Medical Megabank Organization, and from 2017, we are mutually transmitting lectures to the Human Security International Education Course.
Upon completion of the master's program in public health, students receive the MPH (Master of Public Health) degree, which is required for active work in the field of health care administration and clinical research all over the world.
The department has its own website (http://www.sph.med.tohoku.ac.jp/), so please refer to it for details.

(1)General
Course Features
This course is the basis of this major. Applicants are assigned to one of the eight department in this major. And students take required subjects related to "public health," such as epidemiology, medical statistics, and medical ethics, and furthermore, they focus on curricula related to their field of study.

Contents of Education
Introduction to Epidemiology and Research Design, Medical Ethics 1, Social Medicine Seminar, Introduction to Medical Statistics, Introduction to Behavioral Medicine, Health Care Administration, and Environmental Medicine are required subjects. Students will write a master's thesis as thesis research.

Career Plans after Graduation
Enter research and educational institutions (relating to the 13 fields of this major), pharmaceutical companies, think tanks, etc.
Medical Administration, International Health Organization
Enter the Graduate School of Medicine, Doctoral Program (Medical Course)

(2)Course to Train High-Level Clinical Research Administrators
Course Features
In Japan, recognition of necessity of infrastructure for medical research of clinical trial and transformer rational research has risen since the latter half of the 90's. But it has been insufficient yet and we have to promote talents who support these very fast.　In this course, we promote specialists who support medical research, such as a clinical research coordinator (CRC), a data manager, a drugs' cosmetics and medical instrument specialist, an IT specialist, at the departments of Epidemiology, Biostatistics, and Medical Informatics while we cooperate with the Clinical Research, Innovation, and Education Center (CRIETO), TAMRIC, the Tohoku University Hospital.
You can take not only systematic lectures on medicine but a practice (training) for your specialties from the early stages of the course, so that you can take advantage of contents learnt in the lectures. We attempt to promote 'Advanced Medical Research Supporter' who make the best use of individual specialty and can well cooperate with other medical researchers.

Contents of Education
Introduction to Epidemiology and Research Design, Medical Ethics I, Introduction to Medical Statistics, Introduction to Behavioral Medicine, Health Care Administration, and Environmental Medicine are required classes. In addition, in the required Clinical Research Practice I, students participate in planned or ongoing clinical research, and practice making plans and questionnaires, managing actual data, and analyzing data using statistical packages. In addition, students will take multiple elective classes.

Career Plans after Graduation

・Entrance into the Graduate School of Medicine, Department of Medical Sciences (Doctoral Program).
・Employment at medical treatment and pharmaceutical institutions, and food-related and medical equipment development companies, and public offices (especially medical-related), etc.
・By occupation, they are a medicine researcher, biostatistician, clinical research coordinator, people responsible for medical information, clinical psychologist, psycho oncology specialist, etc.

(3)One-Year Course to train Physicians and Dentists for Clinical Research
This course is designed mainly for Japanese students, and are taught only in Japanese.

(4)Course in Public Health and Genetic Counseling
Course Features
This course is for training students to become Certified Genetic Counselors (CGC, Academic Board Certification). It is designed to cultivate genetic counselors as high-level medical professionals that can work together with patients and families with an understanding of their position, and who have excellent communication skills and the latest knowledge on genomes to provide genetic counseling. Lectures are conducted in partnership with genetic medicine and various clinical departments, as well as hospitals and other research departments. Our program has been accredited for its professional development program by the Japanese Board of Genetic Counseling (jointly established by the Japan Society of Human Genetics and the Japanese Society for Genetic Counseling). This course is designed mainly for Japanese students, and are taught only in Japanese.

Contents of Education
Genetic Counselors

Career Plans after Graduation
Genetic Counselors

(5) Leadership Training Course in Medical Ethics and Public Health
Course Features
The purpose of this course is to train leadership in medical ethics and public health and develop capable educator-researches who can support diverse ethics-related activities in various areas including healthcare institutions and research facilities. This course is designed to educate undergraduate graduates who want to learn biomedical ethics and public health ethics in postgraduate level. The course is also offered to healthcare professionals and individuals who are expected to support ethics-related activities including ethics committee and ethics consultation in their own workplaces. Students belong to the Department of Medical Ethics and learn philosophical basis of biomedical ethics, its history, major problems in biomedical ethics, research ethics and public health ethics, as well as research methods in this field. They are also expected to join research ethics committees and ethics consultations as an observer. This course is designed mainly for Japanese students, and are taught only in Japanese.

Contents of Education
・Research Ethics and Ethics Committee: This course provides comprehensive educational program concerning research ethics with

humans. Students observe research ethics reviews in Tohoku University Graduate School of Medicine and Tohoku University Hospital.
・Clinical Ethics and Case study：This course provides students with comprehensive educational regarding practical clinical ethics. Students also participate in clinical ethics consultation held in Tohoku University Hospital and other healthcare institutions
・Introduction to Ethics and Bioethics：This course examines major fundamental theories, principles, concepts, and controversies in ethics and bioethics. The course is intended to serve as a basis of all other courses.
・Descriptive Ethics and Empirical Study：This course is intended to serve as an opportunity to read various types of empirical research papers in the field of biomedical ethics in major international journals. The course focuses on detailed methodologies applied in these published studies.
・Public Health Ethics：This course examines major ethical issues in public ethics as well as national healthcare system
・Medical Humanities (Medical Ethics 2): This course presents students commercial films as case involving ethical dilemmas and the students discuss identified moral problems in a small group from the medical humanities' standpoint of view.
・Students will also learn the basics of medicine, life science, and public health through essential and elective courses.

Career Plans after Graduation
Entrance into the Graduate School of Medicine, Department of Medical Sciences (Doctoral Program).
Researchers of biomedical ethics at academic institutions
Ethics committee members in healthcare institutions
Biomedical ethics educators in healthcare institutions

(6) Disaster Medicine and Health Care Management Course
Course Features
This course is designed to provide the opportunity to learn about not only emergencies but also long-term medical and health care management during and after disasters, such as earthquakes, tsunamis, pandemics, and disasters involving chemical agents, biological agents, radiation/nuclear attacks, or explosives (CBRNE). This course is open mainly to nurses, pharmacists, medical administrative officers, and other medical professionals. Students in this course acquire knowledge of public health and disaster-related medical and scientific issues through the acquisition of a master degree of public health. This course is designed mainly for Japanese students and is taught only in Japanese.

Educational Content
Disaster medicine and health care seminar, disaster medicine and health care training, disaster sciences, public health

Career Plans after Graduation
An enhanced career in students' respective medical professions
Entrance into a doctoral program in medicine and medical sciences

(7) International Course of "Public Health Science for Human Security"
Course Features
After the cold was ceased in the early 1990's, the concept of "Human Security" has become the primary common concern of international society. The new concept addresses the issues of security of "people", instead of "nations", such as

illnesses, disasters, poverty, conflicts and so forth. Particularly in developing countries such as some nations in Asia, people's lives and dignity have been threatened by diseases and injuries which are basically not curable because of poverty, natural disasters, poor environmental hygiene, malnutrition and so on. In addition, epidemics and environmental pollution jeopardize human security by crossing border perspectives based on interdisciplinary views and scientific knowledge.
The International Course of "Public Health Science for Human Security" is designed to develop students' comprehension of the closely related factors which affect peoples' lives and also their ability to produce solutions, by integrating the latest knowledge of medical science and international health with the method of the humanities and social sciences. The course further aims to nurture researchers and public health leaders in international society who will contribute to the realization of human security by taking leadership in solving security problems in public health.
This course is based on the "International Post-Graduate in Human Security," and is conducted in collaboration with three other graduate schools (Agricultural Science, International Cultural Studies and Environmental Studies), from among which students may select elective courses. All elective and obligatory courses are lectured in English.

Contents of Education
Exercise on Human Security A,B, etc.

Career Plans after Graduation
Entrance into the Graduate School of Medicine, Department of Medical Sciences (Doctoral Program).
public offices (especially medical-related), etc

Ⅴ Introduction to Medical Sciences Master's Programs

(1) General Course

The Major Medical Sciences trains students to take on the challenge of solving critical issues in the field of medicine. In order to conduct cutting-edge medical research, it is important not only to acquire highly specialized knowledge and an understanding of world-class research, but also to have a strong desire to take on important challenges that no one else in the world has solved. In the Major of Medical Sciences, in order to nurture human resources in the field of medicine with diverse perspectives while making the most of the individuality and talents of each student, we have built an environment in which graduate students can actively promote their research by enhancing the multifaceted guidance system, such as the "multiple faculty advisory system" and the "graduate school retreat". In addition, there are facilities to support research, such as a common equipment room, which allows students to conduct research using state-of-the-art research equipment beyond the boundaries of the laboratory. On the other hand, it is possible to attend many lectures at the Internet School of Tohoku University (ISTU) from outside the university, so working people can pursue their degree while continuing to work.

(2) Quantum Biology and Molecular Imaging Course

Molecular imaging examines behaviors of in-vivo biological systems including genes and proteins. It is involved with new boundary/interdisciplinary areas of medicine, pharmaceutical sciences and engineering. Molecular imaging uses positron emission tomography (PET), magnetic resonance imaging (MRI), optical imaging, etc. Molecular imaging allows viewing changes of biological systems on a molecular base and understanding them dynamically and quantitatively. It is anticipated as a measure to diagnose cancer and dementia such as Alzheimer's disease in a very early stage.

To establish an extremely early diagnosis method based on molecular imaging, there are various technological challenges, e.g., developing equipment and devices in an engineering area, molecular probes in an area of pharmaceutical sciences, and diagnostic modalities in areas of medicine and dentistry.

The course on "molecular imaging" deals with research and education relating to molecular imaging. It targets developing advanced diagnostic modalities by integrating molecular imaging with up-to-date science and technology through not only advanced medicine including radiology, nuclear medicine, pharmacology, oncology, psychiatry, etc., but also through interdisciplinary approaches in the fields of pharmaceutical sciences, engineering and dentistry.

Some programs of this course are conducted in collaboration with the National Institute of Radiological Sciences (NIRS).

(3) Tumor Training Course

A malignant tumor, cancer, is the most common cause of death in Japan. One half of patients have cancer. Moreover, one third of the patients die from it. Our objective in this course is to train a specialist. The tumor training course is divided into four, i.e., radiation oncology, medical oncology, palliative medicine and surgical oncology. All students study clinical oncology from the general to the particular in lecture classes. They accumulate practical clinical experiences on radiation oncology, medical oncology and palliative medicine at a training class for a regular period. Further, students write research

papers relating to clinical oncology. In addition, they deepen their knowledge about up-to-date cancer therapy through a cancer professional joint seminar of the advanced lecture class.

(4) Medical Physicists Training Course
Advanced large medical machines are used in areas of diagnostic radiology and radiation therapy. Medical physicists are involved in the development of new instrumentation and technology for use in such fields and in the accurate measurement of the radiation output from radiation sources employed in cancer therapy to contribute clinical and scientific advice and resources to solve the numerous and diverse problems that arise continually in many specialized medical areas. Medical physicists are required to get credits in medicine, physics and clinical experience. Graduates of the Department of Radiation Technology in the Health Science Course and those of the Physical or Engineering Faculty are entered into this course. Medical physicists trained in research, education and medical treatment as team members with other medical specialists are trained.

(5) Comprehensive Medicine Course
In this course, advanced clinical medical education, practical general practice training and medical management learning, which have traditionally been conducted independently by university hospitals and community hospitals, will be integrated with university hospitals and community hospitals.
Through this program, you can develop your career as a family medicine specialist, cultivate your knowledge of advanced clinical medicine, and promote clinical research while conducting on-the-job training at a community hospital (community education center).
Our goal is to train "conductor-type general practitioners" who have the latest knowledge to triage patients by judging the necessity of advanced medical care, demonstrate leadership to manage community comprehensive care consisting of medical care, nursing care and welfare, and promote community-based clinical research.

(6) Medical AI Course
Japan is facing many medical issues such as an aging/aging society, uneven distribution of medical personnel and labor reform. In order to overcome these issues, this course promotes a doctoral human resource development program in cooperation with universities, research institutes, companies and local governments throughout the country aiming to "cultivate human resources who can curate a wide range of medical issues unique to each region and design AI solutions."
The curriculum begins with lectures on cutting-edge AI research and development, and students will learn how to best utilize the AI knowledge to address real-world medical issues. The goal of this course is to train students to become "leading-edge AI research and development personnel" with the ability to solve "global and local medical issues" by exchanging lectures on medical AI at other universities.
*Make sure to understand fully the research contents of desired department and make sure to inform the Clinical AI Management Office of your intention to take the examination before submitting your application.
Contact : https://www.shp.hosp.tohoku.ac.jp/Clinical_AI/#cu_sec

(7) Disaster Medicine and Health Care Research Course
Due to the increasing frequency of disasters like the Great East Japan earthquake accompanied by the Fukushima Nuclear Power Plant accident, research on Disaster Medicine and Health Care has become imperative. This course is designed to provide the opportunity to scientifically study disaster medicine and health care during and after disasters, such as earthquakes, tsunamis, pandemics, and disasters involving chemical agents, biological agents, radiation/nuclear attacks, or explosives (CBRNE). This course is open mainly to medical doctors, dentists, nurses, pharmacists, medical administrative officers, and other medical professionals. Students in this course not only acquire knowledge of disaster-related medical and scientific issues, but also the ability to conduct medical research on disasters and humanitarian responses. This course is designed mainly for Japanese students and is taught only in Japanese.

Educational Content
Disaster medicine and health care seminar, disaster medicine and health care training, disaster sciences, medical research on disasters

Career Plans after Graduation
Leaders in academic disaster research

(8) Network Medicine Course
Teaching based on the New Medical Research Paradigm of Network Medicine
Network Medicine is a new medical research paradigm advocated by research groups working at Tohoku University, led by the Graduate School of Medicine. The aim of this novel approach is to develop innovative diagnostic, treatment and prevention strategies based on signal transduction networks and to promote the development of teaching and research applicable to different diseases and areas. Network Medicine has been designated as one of Tohoku University's Global Center of Excellence (COE) programs. The Network Medicine Course offers students the opportunity to be taught in English based on results from this latest frontier of medical research