

## ► Introduction to the Programs

### Spintronics (GP-Spin)

The goal of GP-Spin is to produce doctoral students with strong academic and international skill sets, through an international, jointly supervised education. They are expected to lead both academic and industrial fields with their background in spintronics. We place an emphasis on an education in the fundamentals so that when faced with a wide variety of problems they are always equipped with a broad knowledge base. One of the greatest advantages of being a part of GP-Spin is the supervision provided by world-leading professors in the field of spintronics. The students will receive deep basic knowledge as well as a broad global vision in addition to their doctoral degree.

### Data Science (GP-DS)

The Graduate Program in Data Science provides an integrated educational/research environment in which the students can learn the foundations of data science, such as analytics and computer science as well as the translational aspects of data science. It is conducted by the Graduate School of Information Sciences in cooperation with the Graduate Schools of Engineering, Economics and Management, Life Sciences, Medicine, and Science (Mathematics). The students join the program in their 2nd year of the master course and work for the doctoral degree under the joint supervision of dual mentors in the partner and Tohoku universities. The curriculum consists of data science subjects, training in big data analysis, big data challenges, and long-term collaborative research with partner universities.

### Neuro Global

The Neuro Global Graduate Program aims to nurture students in an international environment by collaborating with top-class foreign universities in the field of neuroscience and related life sciences. English-based lectures covering a wide range of research fields have been systematically established. The students will also enjoy significant benefits from a retreat with foreign students as well as an internship abroad after QE1. Core facilities with cutting-edge equipment are open to students belonging to the program.

### Integration of Mechanical Systems (GP-Mech)

The graduate program for Integration of Mechanical Systems develops a multi-disciplinary study, including robotics and aerospace engineering. These subjects require the integration of various knowledge bases and insight into mechanical systems. With continuing our activities toward globalization, the program offers an international education and research environment and the opportunity to work on cutting edge technology in the world. This environment fosters future researchers and engineers to lead global innovation by designing and implementing integrated mechanical systems that work for challenging applications.

### Materials Science (GP-MS)

The international joint graduate program in materials science will offer an advanced and comfortable research environment to students around the world. The goal is to cultivate global-minded leaders who can take up active roles in cutting-edge technologies based on materials science. It will also serve as a bridge between academia and industry. An interdisciplinary approach is called for to solve complex challenges such as energy and environmental issues.

### Earth and Environmental Sciences (GP-EES)

The educational philosophy of the Graduate Program in Earth and Environmental Sciences (GP-EES) is to develop human resources who have the motivation and ability to understand the entire earth system, and to build an international education research program that is seamlessly available across different areas of research and countries where research institutes are located. Students who have completed GP-EES are expected to acquire not only high-level research capabilities but also to write international-quality theses, thereby enhancing Japan's international leadership and presence in the field of earth and environmental sciences.

### Physics for the Universe (GP-PU)

The research and educational field of GPPU broadly covers physics related to the Universe, i.e. elementary particle physics, nuclear physics, astronomy and cosmology. The educational program contains actual practice using cutting edge devices and systems developed alongside the construction of large scale high energy and nuclear experiments, in which Tohoku University is deeply involved. It also nurtures academic leadership with a series of hot-topic seminars followed by facilitated discussions.

### Japanese Studies (GP-JS)

The goals of this graduate program can be summarized in the following 3 points.

1. To take up issues such as "conflict resolution" and "sustainability" that have become urgent issues in contemporary society and to further the development of multidisciplinary, pluralistic, and innovative "Japanese Studies."

2. To propose solutions to contemporary social issues based on "empathy" and "harmony" and to pursue policies that can bring about well-being.

3. In implementing goals 1. and 2. above, to train leaders who can be active in international society and who will make broad scholarly accomplishments.

### Resilience and Safety Studies (GP-RSS)

As awareness of global issues involving human security, natural and anthropogenic disasters are in increasing demand in disaster science research, the objective of our graduate program is to provide a trans-disciplinary educational platform for young leaders interesting in understanding the eco-socioeconomic mechanisms that underlie current societal conflicts. Particularly, we value early exposure to international collaboration, and encourage our students to seek hands-on learning experiences throughout their Ph.D. Our program is comprised of 6 graduate schools within Tohoku University, with diverse faculty ranging in various areas of research expertise related to human resilience.

# Tohoku University International Joint Graduate Programs

To take advantage of our strengths, we have selected fields in which we currently lead the world, and fields that will be important to contribute to the evolution of humans in the future, and we are pushing to expand our knowledge beyond the borders of one particular department or field. We are collaborating closely with other leading universities around the world to perform joint education and research, with the aim of educating globally capable and responsible young people through our education programs.

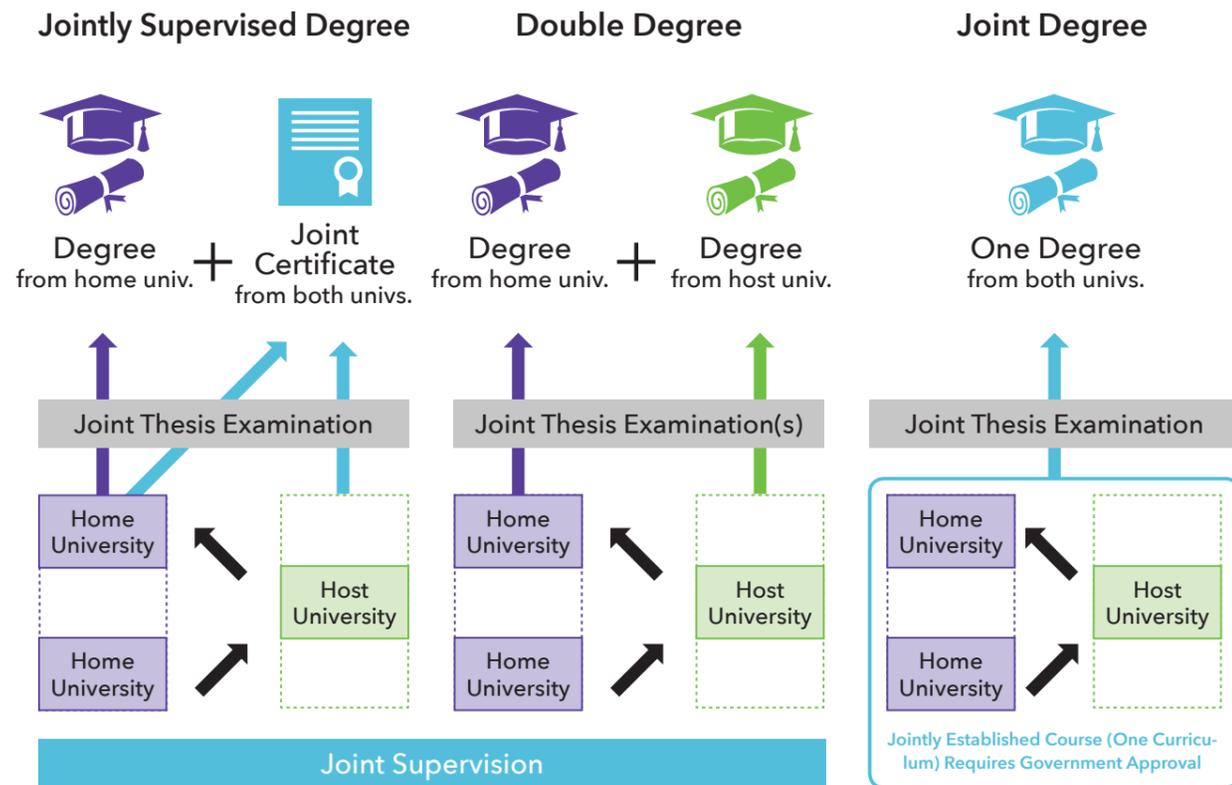
## ► Ideas and Roles

- 1 Meet present needs and cultivate highly capable human resources across the world.
- 2 Develop cutting-edge education programs which also increase our research abilities.
- 3 Create an intellectual foundation for the future, support international competition, and create innovation to aid in the creation of a sustainable global society.

## ► Program Traits

- 1 Interdepartmental graduate degree programs.
- 2 Jointly supervised instruction between Tohoku University and overseas institutions.

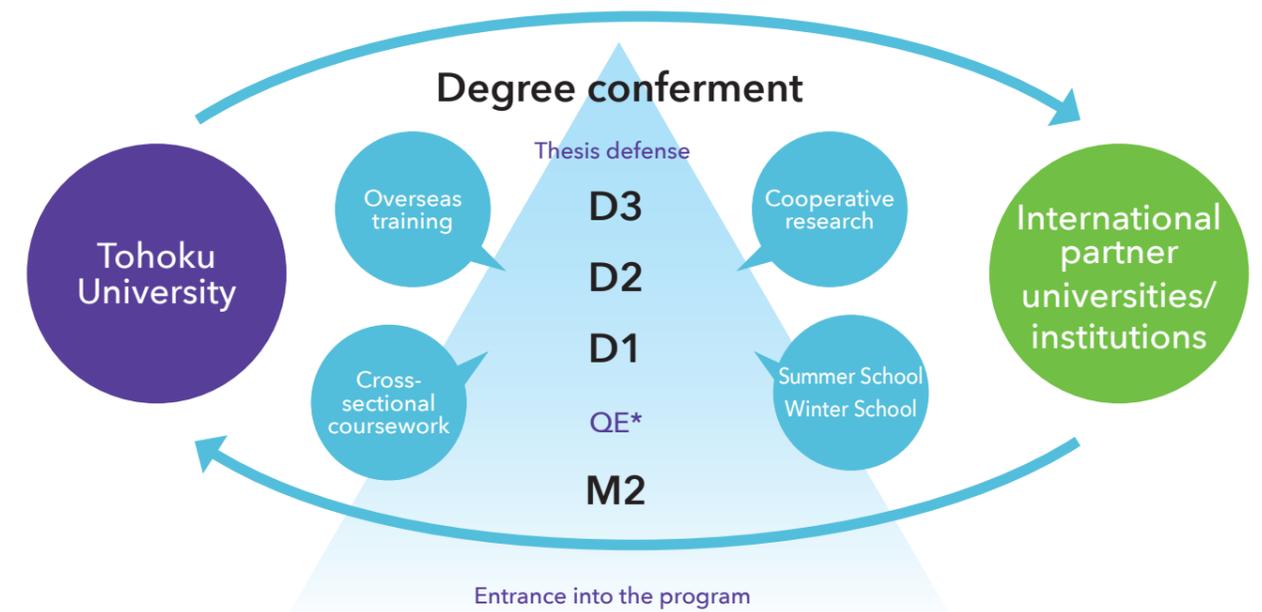
## ▶ Tohoku University Joint Education Programs Comparison



	Jointly Supervised Degree	Double Degree	Joint Degree (to be amended)
<b>Definition</b>	The degree will be awarded by the student's home university. Advising and thesis examination will jointly be done. A joint signatory "Certificate of Jointly Supervised Degree" will be issued.	This is a Degree awarded by multiple universities after educating the students in a fixed course, but utilizing credit exchanging etc.	A joint signatory Degree will be issued.
<b>Educational Program</b>	The educational program will be independently administered by the individual university. Both universities will be able to offer special courses for the jointly supervised degree students.	It is desirable to be negotiated between universities.	It is indispensable to be negotiated between universities.
<b>Degree Conferment</b>	The degree will be awarded by the student's home university. It is substantially closer to joint Degree.	The Degree can be awarded by each university under the existing legal system in each country.	The existing legal system in each country may obstruct the Degree awarding process. The overseas university should hold the rights of Degree accreditation.

## ▶ Program Image

Collaborating with other leading universities around the world, Tohoku University carries out cross-sectional coursework; for example, it sends students to partner universities, accepts international students for Summer/Winter School, or performs joint education and research with partner universities. Students will be conferred a jointly-supervised certificate (or joint degree in the future).



### Participating Graduate Schools

- ▶ Arts and Letters
- ▶ Education
- ▶ Law
- ▶ Economics and Management
- ▶ International Cultural Studies
- ▶ Educational Informatics Education Division
- ▶ Science
- ▶ Engineering
- ▶ Agricultural Science
- ▶ Information Sciences
- ▶ Environmental Studies
- ▶ Biomedical Engineering
- ▶ Medicine
- ▶ Pharmaceutical Sciences
- ▶ Life Sciences

### Partner Universities

- ▶ Johannes Gutenberg-Universität Mainz
- ▶ University of Bayreuth
- ▶ Case Western Reserve University
- ▶ University of Regensburg
- ▶ University of Hawaii etc.

\*Qualification Exam (QE):

At the end of the second year of the Master's program, students are to take the QE to be assessed whether they have full filled the requirements to start their doctoral research.

## ▶ Curriculum Example (Spintronics(GP-Spin))

	grade	GP-Spin	
Doctoral Program	D3	Prospective degrees	Jointly supervised degree, Joint degree (in future)
		Thesis defense	QE2
	D1-D3	Practical	Practical Spintronics I, II
		Advanced	Applied Spintronics I, II
Master's Program	M2	Overseas research training	Spintronics Overseas Training
		Communication	Training for Global Communication Skill
		Thesis defense	QE1
		Seminar and Research	Master's Seminar and Research
	M1	Fundamental	Fundamental Spintronics I, II, III
Basic		Basic Spintronics I, II	
			Selective examination for the program