Doctoral Program in Geosciences

Doctor of Philosophy in Science

Program Educational Objectives

The students who understand various global natural phenomena in the past and at present, have advanced expertise and research capabilities that can contribute to solution of various problems on a global scale, and can contribute to the scientific development of Japan as researchers who can internationally play an active role.

Graduate Profile	– The person with both a wide basic knowledge and outstanding expertise. – The person with an outstanding ability for areawork or a high ability for experiments/data analysis. – A person with problem-solving skills concerning geoscientific issues. – The person with distinguished foreign language skills and communication skills. – The person with an ability to teach in higher educational institutions such as universities. – A person with a high ethical perspective for research activities.

Diploma Policy

The degree of Doctor of Philosophy in Science is commenced to those who have fulfilled the requirements for the completion of the Doctoral programs, as set out in the Graduate School Regulations of the University of Tsukuba and related university regulations, and who are deemed to have the following competences.

	Competences	Evaluation perspectives
Knowledge and Skills	1. Knowledge creation competence: Ability to create new knowledge that can contribute to future society	①Are there any research findings that can be considered new knowledge? ②Can we expect you to create knowledge that will contribute to future society?
	2. Management competence: Ability to plan and implement measures to identify and solve challenges from a higher perspective	①Can you make and implement long-term plans for critical challenges? ②Can you identify challenges, even in other areas of expertise, and solve them from a higher perspective?
	3. Communication competence: Ability to express the true nature of academic findings positively and clearly	①Can you explain the true nature of research content and specialized knowledge clearly and logically to researchers from different areas and to people other than researchers? ②Do you proactively share your findings with researchers and experts from your field of expertise and accurately answer questions?
	4. Leadership competence: Ability to have objectives get accomplished under your leadership	①Can you set attractive and compelling goals? ②Are you capable of building systems to realize goals and accomplish objectives as the leader?
	5. Internationality competence: Possession of a high level of awareness and motivation to be internationally active and contribute to international society	①Do you have strong awareness and motivation to contribute to international society and international activities? ②Have you obtained adequate linguistic skills for international information collection and action?
	6. Knowledge and comprehension ability: a highly specialized knowledge and comprehension ability related to geoscience.	①If capable of setting a specialized research tasks related to geoscience. ②If capable of planning and executing specialized research plan related to geoscience.
	7. Planning ability: an outstanding planning ability to set a specialized research tasks and form a distinguished research program to execute.	①If having an advanced expertise related to geoscience. ②If having comprehensively understood the basic principle behind various events behind geoscience.

	Competences	Evaluation perspectives
Knowledge and Skills	8. Problem-solving ability: an ability to confront various issues and solve the problems by exploring the basic principle behind them.	①If capable of recognizing various problems related to geoscience. ②If capable of solving various problems related to geoscience.
	9. Expressiveness: an ability to express themselves based on outstanding foreign language skills and communication skills.	①If having outstanding language skills. ②If having communication skills to enable students to express the research outcomes relating to geoscience by themselves.
	10. Creativity: a distinguished creativity to confront various issues in high demand for expertise with a fresh view, and apply results obtained from research.	①If capable of tackling various issues from a new viewpoint related to geoscience and achieving research outcomes. ②If having creativity to apply the research outcomes related to geoscience.
Guidelines for Assessing Learning Outcomes	The evaluation of learning outcomes is conducted through achievement-level assessments based on the "Achievement Assessment Rubric". At each of the following stages, the level of acquisition of competences stipulated in the Degree Award Policy is objectively verified and evaluated: – Semester-by-semester reviews of research progress conducted by the Advisory Committee – A midterm review conducted at the degree program – A preliminary review conducted at the degree program – A public thesis defense and the final examination conducted by the Thesis Examination Committee	

Evaluation Criteria for Degree Theses/ Dissertations	The thesis that satisfies all the following evaluation items shall be a pass as the thesis for doctoral degree after going through the final examination. Additionally, the thesis shall be examined by the committee for master's thesis review (composed of one chief examiner and two or more sub examiners). While the instructor shall be the sub-examiner in charge of master's program in geoscience, the instructors in charge of other degree programs can participate in such examination. 1. If the submitted doctoral thesis is extremely high in degree of completion including descriptions, logic expansion and charts. 2. If the level of the contents of doctoral thesis is internationally high as the research in the area of geosciences. 3. If the references are appropriately cited for the doctoral thesis. 4. If contribution to the research contents of doctoral thesis by the applicant of master's degree has been sufficiently recognized. 5. If academic rank, contents and future developments of doctoral thesis are sufficiently understood. 6. If questions and answers are properly carried out in presentation.

Curriculum Policy

In this Degree Program, subject to the students who have the knowledge to complete the master's degree relating to geoscience, the curriculum shall be organized aiming at training the human resources that research the process and mechanism of various phenomena in global environment, or earth evolution from the birth of the Earth up to the present, have an ability to gain a comprehensive elucidation from various aspects including human environment and can internationally play an active role. For this purpose, this Degree Program is composed of area of expertise (including cooperated graduate school) necessary for this Degree Program. In all such areas, the curriculum has been organized in order to learn the specialized knowledge relating to specific area necessary to achieve the diploma policy mentioned above and acquire foreign language skills, communication skills, an ability to lead, a problem-solving ability, ethical view.

Curriculum Design Framework	– Regarding setting of course classification, the curriculum shall be divided into “Foundation Subjects for Major” and “Major Subjects”. “Foundation Subjects for Major” shall especially deal with the contents common to the area of earth evolution sciences, and the basic knowledge relating thereto shall be acquired. In “Major Subjects”, thesis research/practical training in each area shall be provided, through whose completion high specialized knowledge in specific research areas can be acquired. – The students aiming at acquisition of doctoral degree can receive highly intensive tutorial in a series of curricula until completion of the degree, by the supervision group composed of the chief supervisor mainly in charge of research instruction and the sub supervisor(s) who cooperate(s) with such research supervision as advisor(s).

Curriculum Design Framework	– Through advanced studies and special lectures in the area of expertise, Communication competence, Leadership competence and an ability to solve problems shall be acquired. – Acquire the abilities of all 10 competences through special exercises in each specialty – Acquire communication skills, leadership skills, and problem-solving skills through internships. – By taking research planning fieldwork courses, Management competence, Communication competence, Leadership competence, research ability, problem-solving ability, ability to explore and presentation ability shall be acquired. – Through Graduate General Education Courses, communication skills and research ethics shall be acquired.
Teaching and Learning Methods	– In the 1st year, Foundation Subjects for Major and the Major Subjects related to each area of expertise (advanced studies/special lectures /exercises/research planning area courses etc.) shall be taken. – In the 2nd year onward, research for creation of the doctoral thesis shall be carried out. Additionally, the students who register in Early Completion Program shall work on creation of the doctoral thesis from the 1st year. – Upon commencing the 1st year, for all the students the advisory committee (research supervision team) composed of the team of a chief supervisor and several sub supervisors shall be established to organize validity and problems of research plan for each student. Additionally, instruction shall be provided to confirm registered courses and acquired credits etc. The advisory committee shall participate in other master' programs, as necessary.

Admission Policy

Desired Student Profile	In any of the area of expertise of geosciences, the desired student shall have basic specialized have the knowledge to Graduate school master's course and above, motivation to deeply explore various natural phenomena on the earth both in the past and at present and have acquired interdisciplinary knowledge for their comprehensive settlement. Especially, the student who has a deep interest in scientifically observing and analyzing natural phenomena and lab tests/observation and field work such as area observation and survey shall be welcomed. It is required that the student shall be willing to study basic science steadily and endeavor to think logically from international vision.
Student Selection Process	– The knowledge and academic skills motivation to research, ability for logical thinking and presentation ability shall be evaluated by document screening and oral examination. – Selection for working individuals (including “Early Completion Program” for working individuals) and entrance examination for overseas double degree program shall be implemented.

Learning Support Framework

Academic Support	Through the advisory committee system, multiple faculty members provide complementary support for students' learning. In addition, financial support is provided through university-wide schemes or program-specific mechanisms to ensure that students can fully engage in their academic activities.
Opportunities for Peer Interaction	By actively promoting discussions and collaboration beyond individual laboratory boundaries at the academic field level, the program encourages interaction with faculty members other than the primary and secondary academic advisors. Opportunities for dialogue are also provided at the degree program level.
Opportunities for Student–Faculty Interaction	Each faculty member reviews their syllabus annually, renewing their awareness of the importance of educational quality. In addition, quality is assured through repeated checks at the degree program level. These efforts are particularly evident in the quality of master's theses, and improvement measures are considered through the thesis review process.

Approaches to Assuring and Enhancing Educational Quality

- The students' learning outcomes are evaluated at educational meetings, advisory committee se-ssions, and five annual research presentation meetings. Through these evaluations, the validity of the curriculum and the appropriateness of academic supervision are examined.
- A Faculty Development (FD) Committee on Academic Affairs has been established to ensure the quality of education by continuously reviewing and improving all educational activities, thereby strengthening the framework for achieving the objectives of the degree program.