Master's Program in Biology

Master of Science

Program Educational Objectives

In the eight research areas, Taxonomy & Evolution, Ecology, Plant development & physiology, Animal development & physiology, Molecular cell biology, Genome informatics, Advanced cell biology, Advance molecular biology, the students in doctoral program, teachers in junior high schools/high schools and advanced professionals etc. who have wide knowledge and fundamental research ability, ability to explore issues and practical skills, and ability to disseminate scientific knowledge to society shall be trained.

Graduate Profile	The human resources who have the following abilities shall be fostered: – Having learned knowledge in the area of expertise and fundamental research ability. – Possible to logically grasp the biological world and phenomenon and to work on the problems set from the basic scientific perspectives and to explore the basic principle behind them. – Having acquired presentation/communication skills.

Diploma Policy

The degree of Master of Science is commenced to those who have fulfilled the requirements for the completion of the Master's 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 application competence: Ability to contribute to society with advanced knowledge	①Can you apply knowledge gained through research and other activities in society? ②Can you identify new problems, even in other fields of expertise, based on broad knowledge?
	2. Management competence: Ability to appropriately address challenges from broad standpoints	①Can you take on major tasks with systematic planning? ②Can you understand and solve problems from multiple perspectives?
	3. Communication competence: Ability to accurately and clearly communicate expert knowledge	①Are you capable of efficient communication for research purposes? ②Can you discuss research or research-specific knowledge with experts from your own field and from other fields?
	4. Teamwork competence: Ability to work with a team and actively contribute to the achievement of goals	①Do you have experience cooperatively and actively working on challenges as part of a team? ②Have you helped promote projects and activities other than your own research?
	5. Internationality competence: Willingness to contribute to international society	①Are you aware of making contributions to international society and getting involved in international activities? ②Have you obtained the linguistic skills necessary for international information collection and action?
	6. Knowledge in natural science: comprehensive knowledge in general natural science	If capable of understanding the trend in fundamental research in various areas of natural science.
	7. Knowledge in biology: comprehensive basic knowledge in general biology in order to logically grasp the biological world and phenomenon	If having comprehensive basic knowledge in general biology in order to logically grasp the biological world and phenomenon.
	8. Research ability for biology: ability to research the problems set from the biological perspectives	If having advanced knowledge relating to the area of expertise of biology and ability to accomplish experiments

	Competences	Evaluation perspectives
Knowledge and Skills	9. Ability to explore biology research: ability to explore new problems and issues behind the research outcomes acquired	If having abilities to understand the basic school regulations behind real-life biological problems and to solve new problems
	10. Ability to disseminate biology research: presentation ability and communication skills to disseminate research outcomes	If having presentation ability and communication skills for research in the area of expertise.
Guidelines for Assessing Learning Outcomes	The evaluation of learning outcomes is conducted through achievement assessments based on the "Competence Achievement Evaluation Sheet". This process objectively verifies and evaluates the acquisition of competences aligned with the degree conferral policy at each stage. The stages and methods of achievement assessment are outlined below. At the end of the first-year fall semester, the primary and secondary advisors conduct an interim assessment. This provides a comprehensive evaluation of whether the student meets the competences regarding research progress, related knowledge, and presentation skills. In the middle of the second year's fall semester, the Preliminary Review Committee conducts a preliminary thesis review (public). This confirms the student's learning status and provides guidance toward the final achievement assessment. After passing the preliminary review, students who submit their final thesis undergo a master's thesis review conducted by a thesis review committee composed of the primary supervisor and at least two secondary supervisors. Concurrently with the final review, a final achievement evaluation is conducted. At this time, students are required to document competences related to activities beyond coursework, such as research activities (international collaborative research, experience presenting at domestic/international conferences), participation in various workshops, and involvement in organizing academic societies or research meetings. This actively evaluates independent learning and research activities.	

Evaluation Criteria for Degree Theses/ Dissertations	The dissertation that satisfies all the following items shall be a pass as the thesis for master's degree after going through final examination. Further, the committee for master's thesis review (one chief examiner and two or more sub-chief examiners) shall examine the dissertation. Additionally, as appropriate the faculty member(s) of other master's programs shall be able to participate in such examination as sub examiner(s). 1. If the real problems in biology are set from perspectives of basic science or the ones that anticipate their applications. 2. If research methods of theory, experiments and survey used for exploring problems and analysis methods for data obtained are scientifically appropriate. 3. If the points of argument from problem setting to conclusion are unfolded demonstratively and logically. 4. If the academic results for the problems set are acquired. 5. If the dissertation is presentable as a thesis for master's degree.

Curriculum Policy

Based on understanding diversity of the biological world, in order to acquire the ability to elucidate the basic principle of biological phenomenon, the curriculum shall be organized focusing on the eight research areas, Taxonomy & Evolution, Ecology, Plant development & physiology, Animal development & physiology, Molecular cell biology, Genome informatics, Advanced cell biology (cooperated graduate school), advance molecular biology (cooperated graduate school) that constitute this degree's program.

Curriculum Design Framework	Centering around the students' major area, in order to contribute to cultivating basic knowledge and wide view, generic competences in relevant areas, one or more credits shall be registered from Graduate General Education Courses, Inter-disciplinary Foundation Courses and Degree Programs' Common Courses. The specialized lectures as specialized courses in area of expertise and practical training and special research as selective compulsory courses shall be registered and basic knowledge and skills of the area of expertise shall be learned. – From Degree Programs' Common Courses, Inter-disciplinary Foundation Courses and Graduate General Education Courses, the ability to understand approaches of natural science, and in addition, comprehensive ability, such as information science, research ethics, bioethics, communication skills and ability to disseminate research outcomes etc. shall be acquired. – By Foundation Subjects for Major, fundamental knowledge and ability to understand general biology science including biology and science communication and presentation ability shall be acquired. – By Major Subjects, basic survey/analysis skills in biological research areas of various biological scientific areas shall be learned and ability to research and explore, and to disseminate shall be acquired.

Curriculum Design Framework	– In the seminars of the area of expertise, intensive reading of the newest and latest articles shall be performed and analysis ability and presentation ability shall be acquired. – In research methods of the area of expertise, ability to acquire data through experiments and analysis and to consider the conclusions and problems of research contents shall be acquired. – Through science mediation implementation and TA experience, experience of presentation in research seminars, capacity of teamwork in research practice shall be acquired. – Through presentation in international conference, exchange with international students and collaborative research with foreign researchers, to foster awareness to contribute to international society.
Teaching and Learning Methods	– The standard learning year shall be two years. As the requirements to complete master's degree, it is necessary to acquire the following 30 or more credits, to put the research outcomes together in master's thesis and to pass the final examination. – Compulsory courses: 23 credits including Seminars and Methodology in each area, Science Presentation and Seminar in Advanced Biology shall be the compulsory courses. Especially, in Methodology, research supervision and supervision to create master's thesis shall be implemented. – Selective courses and others: up to seven credits including one or more credit(s) from Graduate General Education Courses, Inter-disciplinary Foundation Courses and Degree Programs' Common Courses respectively shall be granted as credits for completion. – 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 members can be participated from other master' programs, as necessary.

Admission Policy

Desired Student Profile	The desired student shall be the one who has a deep interest in biological world and phenomenon and basic academic skills for biology and strong sprit of inquiry.

Student Selection Process	By adopting various kinds of selection methods, such as general entrance examination, special selection of international students and special selection of working individuals etc., foreign students and working individuals as well as the students who enter immediately after graduation of universities shall be broadly accepted. Through the document submitted and oral examination, the following abilities shall be evaluated: – Through the document submitted and oral examination, the basic knowledge relating to biology and basic academic skills shall be evaluated. – Through the scores of English proficiency examination included in the document submitted, English ability shall be evaluated. – Through the research plan included in the document submitted or oral examination, logical thinking ability and accurate ability of expression shall be evaluated. – Through oral examination, research ability and suitability shall be evaluated.

Learning Support Framework

Academic Support	The primary and secondary advisors provide guidance on presentations and thesis writing. They also offer support for managing research time. Furthermore, they actively encourage participation in events such as the Japan-China-Korea International Graduate Student Academic Forum, Global Science Week, and academic society annual meetings, while providing instruction to enhance presentation skills.
Opportunities for Peer Interaction	In the required course Science Presentation, students deepen their interactions by presenting their own research. Additionally, Seminars involving multiple laboratories provide opportunities for student exchange. Furthermore, the Graduate Student Association organizes poster sessions and networking events, actively encouraging participation from students and faculty both within and outside the degree program. To foster interaction with students outside the university, students present their research findings at academic conferences and research meetings, thereby enhancing their motivation to learn and improving the quality of their research.
Opportunities for Student–Faculty Interaction	Orientation sessions for incoming students and thesis seminars for final-year students are held to provide opportunities for interaction with faculty members. Additionally, Graduate Student Association takes the lead in organizing poster presentations and social gatherings, actively encouraging faculty participation to foster interaction between faculty and students. Furthermore, preliminary thesis review sessions are conducted publicly, encouraging active participation from both students and faculty to create opportunities for interaction.

Approaches to Assuring and Enhancing Educational Quality

The Curriculum Committee shares information on final-year students' research activities (publication of papers, awards received, international collaborative research, presentations at domestic and international conferences, etc.) and discusses whether the quality of education provided to students is assured. Additionally, student surveys, graduation rates, and employment status are shared at the Education Council, where challenges and improvement measures are discussed. Furthermore, faculty participation in the Master's Thesis Preliminary Review Committee is encouraged to stimulate more active discussion.