Master's Program in Life Science Innovation (Bioinformatics)

Name of the degree to be conferred	Master of Bioinformatics
Educational purpose	The Master's Program in Life Science Innovation cultivates highly specialized professionals who possess the world's top-class advanced specialized research ability with cross-disciplinary mind from a higher perspective, open up a new strides in life science research using bioresources, and are globally active in the areas of research and development of innovative pharmaceutical products and functional foods and in the areas of their maintenance and administration.
Vision of human resources development	To contribute to solve problems in the global society through a bioinformatics approach, one needs to gain qualities required to be active in the international society, including the communication ability, linguistic skill, the knowledge in the bioinformatics and associated areas, and the abilities to scientifically challenge and break through the problems that should be solved. The Master's Program in Life Science Innovation is designed to cultivate "highly specialized professionals and those who possess the basic abilities for carrying out a master's thesis research with their sights to become a researcher who can practice the process from identifying to solving problems in bioinformatics using their expanded knowledge and skills cultivated for life science and information science".

Diploma Policy

The degree of Master of Bioinformatics 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 competencies.

Competencies	Evaluation perspectives
1. Knowledge application competence: Ability to contribute to society with advanced knowledge	① Can you apply knowledge gained through research and other activities in society? ② Can 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	① Can you take on major tasks with systematic planning? ② Can you understand and solve problems from multiple perspectives?
3. Communication competence: Ability to accurately and clearly communicate expert knowledge	① Are you capable of efficient communication for research purposes? ② Can 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	① Do you have experience cooperatively and actively working on challenges as part of a team? ② Have you helped promote projects and activities other than your own research?
5. Internationality competence: Willingness to contribute to international society	① Are you aware of making contributions to international society and getting involved in international activities? ② Have you obtained the linguistic skills necessary for international information collection and action?
6. Innovation ability: Ability to open up new developments in the areas of life science	① If the basic concepts about the areas of life science were widely gained and problems are interpreted from a higher perspective ② If one has the motivation to gain new skills and knowledge instead of being bound by one's area of expertise ③ If the social needs in the areas of life science are understood ④ If appropriate research plans are drawn up and carried out to solve bioinformatics issues

7. Specialized knowledge: Advanced knowledge and command of an area of expertise	① If leading-edge specialized knowledge about bioinformatics was gained ② If gained knowledge was put to use to solve issues
8. Advanced practical English: Practical English proficiency that works in the areas of life science	① If an accurate description of one's understandings or opinions about problems in the areas of life science is provided in English ② If written research proposals, reports, etc. are created in English

Dissertation evaluation criteria

【Level standards required for the degree thesis】The degree thesis must be the results of work in which the diploma applicant took the initiative and must contain unprecedented research findings that contribute to make strides in the areas of bioinformatics. The degree thesis must be written logically and scientifically and must be constructed in an appropriate format as a degree thesis.

【Review board members】A thesis is reviewed by an exclusive board formed by one chief reviewer and two or more sub-reviewers. The chief reviewer must be a faculty member assigned to supervise the research in the Program.

As the two or more sub-reviewers, one or more faculty members qualified to supervise the research in the Program must be included. The three or more reviewers of the exclusive board must include one or more reviewers from each of the both internal and external Program faculty members, and this is how diploma examination is administered in a system cooperative between internal and external faculty members.

In addition, as the three or more reviewers of the exclusive board, no more than one reviewer who does not belong to the Program can be included.

【Review method and review items, etc.】The applicant is asked to explain their degree thesis content and then questioned by exclusive board members about what they have explained. During this examination, in which the applicant is required to make a presentation about their degree thesis logically and scientifically, the applicant is evaluated to see if they can convince the reviewers sufficiently by answering the reviewers' questions using the specialized knowledge of the areas of bioinformatics with insight.

Curriculum Policy

Under the education and research environment where there is the active participation by not only the faculty members of Tsukuba but also by collaborative graduate school faculty members from the research institutes or such which belong to the Tsukuba Life Science Promotion Association, students learn about unsolved issues of the society and get engaged in research activities to pursue to open up new strides in the areas of bioinformatics. The Master's Program in Life Science Innovation, whose purpose is to cultivate globally active highly specialized professionals, offers all lectures in English and organizes lectures and seminars taught by researchers who are active in the front lines and belong to overseas research institutes. To cultivate the ability to have the big picture in mind from a cross-disciplinary perspective, students benefit from the General Foundation Subjects which cover all-around basic concepts in the areas of life science. As part of the career training, the curriculum includes internship subjects and other subjects such as for learning the operations of research organizations, etc. Moreover, Major Subjects for cultivating the expert abilities in bioinformatics are also organized.

Curriculum organization policy	・The curriculum in the bioinformatics realms are composed of Major Subjects, the General Foundation Subjects shared by the six realms of the Master's Program in Life Science Innovation (Disease Mechanism, Drug Discovery, Food Innovation, Environmental Management, Bioinformatics, Biomolecular Engineering), and Graduate General Education Courses. With the Major Subjects, in addition to the lectures for cultivating the expert abilities in bioinformatics, students are supervised for bioinformatics research in the laboratory of each student. ・Competence of knowledge application is gained with master's thesis creation, etc. ・Management competence is gained with "Regulatory Science", etc. ・Communication competence is gained with "Master's Research in Life Science Innovation", etc. ・Teamwork competence is gained with "Team Learning in Life Science Innovation (Basic)", etc. ・Competence in Internationality is gained with "Master's Life Science Innovation Seminar", etc.

	· Innovation ability is gained with Major Subjects, "Master's Research in Life Science Innovation", etc. · Specialized knowledge is gained with Major Subjects, etc. · Advanced practical English is gained with General Foundation Subjects, Major Subjects, etc.
Learning methods · Processes	· After learning how to gather information and understanding social needs under the supervision of supervisory faculty members, students draw up and carry out an appropriate research plan for solving bioinformatics issues and round up the results into research outcomes. · Students acquire English presentation skills in the process of presenting their research outcomes at the T-LSI student workshop and other events. · Through General Foundation Subjects and Graduate General Education Courses, students widely gain the basic concepts in the areas of life science and improve communication ability in English in order to be capable of using knowledge not bound by one's area of expertise. · Practical abilities as working individuals are cultivated through internships. · Specialized knowledge is gained through Major Subjects.
Evaluation of learning outcomes	· One year after enrollment, the interim evaluation (Achievement evaluation I) is conducted by the achievement evaluation board formed by the supervisory faculty member and two sub-supervisory faculty members. · At the mid-term presentation which is administered a year after enrollment, the interim review for the progress of research for master's thesis creation is conducted by the supervisory faculty member and two sub-supervisory faculty members. · Four months before the expected completion of the Program, the final evaluation (Achievement evaluation II) is conducted by the achievement evaluation board formed by the supervisory faculty member and two sub-supervisory faculty members. · At the preliminary review which is administered four months before the expected completion of the Program, the preliminary review for the master's thesis is conducted by the chief reviewer and two sub-reviewers. · At the final exam which is administered two months before the expected completion of the Program, the diploma examination is conducted by the chief reviewer and two sub-reviewers based on the presentation and question-and-answer session for the master's thesis content.

Admission Policy

Desired students	We seek candidates who possess the motivation to make innovations in the areas of bioinformatics and have the sufficient qualities to gain the specialized knowledge necessary to attain such innovations, and advanced practical English.
Selection policy	· Candidates are selected through document screening to evaluate if they possess bachelor's degree level knowledge necessary for learning in the Master's Program in Life Science Innovation and the ability to write about research backgrounds and future prospects in English. · With an English proficiency exam, candidates are evaluated if they possess the English proficiency (equivalent to level B2 or higher in CEFR) necessary for learning in the Master's Program in Life Science Innovation. · With an oral exam, students are evaluated if they have the motivation to make innovations in the areas of bioinformatics and the ability to explain and debate in English.