Doctoral Program in Informatics

■ Doctor of Philosophy in Informatics

Program Educational Objectives

Information has played an important role in human activities, but its importance has rapidly increased with recent technological advances. In order to respond to such situations, the Master's Program in Informatics (doctor late semester course) will train personnel engaged in specialized work to utilize information for academic purposes, education, daily life, culture, etc., through an interdisciplinary approach that combines humanities and sciences.

Graduate Profile	Individuals who can see the big picture various problems related to human beings and information, set up research tasks based on their specialized knowledge and skills, and carry them out.

Diploma Policy

The degree of Doctor of Philosophy in Informatics 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. Research competence in Informatics: Advanced research skills to be able to set up advanced research topics in the field of informatics and to independently formulate and carry out research plans.	①Can the student establish essential research topics in the field of informatics that will contribute to the future, based on previous research in specialized fields related to human body, mind, and various activities? ②Are the student's research methods appropriate for solving the set advanced problems and producing original research results?

<table>
<tr><td rowspan="3">Knowledge and Skills</td><td>Competences</td><td>Evaluation perspectives</td></tr>
<tr><td>7. Expertise in Informatics: Latest advanced expertise and operational skills in informatics.</td><td>①Has the student sufficiently acquired the ability to apply advanced and specialized knowledge in the field of informatics?
②Has the student identified new and original problems supported by the latest expertise in the field of informatics?</td></tr>
<tr><td>8. Ethics in Informatics: High ethical standards and normative awareness in the field of informatics</td><td>①Does the student have sufficient knowledge of protecting intellectual property and information security related to research?
②Can the student explain the sense of ethics essential to the field of informatics and the knowledge of protecting intellectual property and information security?</td></tr>
<tr><td>Guidelines for Assessing Learning Outcomes</td><td colspan="2">The evaluation of learning outcomes is conducted by objectively confirming and assessing the acquisition status of competences based on the policy for degree conferral at each stage according to the achievement evaluation using the “Competence Evaluation Chart”.
The stages and methods for achievement evaluation are indicated as follows.
– The faculty member responsible for research guidance conducts the achievement assessment based on a rubric in response to the student's reflection.
– Subsequently, a Doctoral Dissertation Review Committee consisting of a primary examiner, secondary examiners, and reviewers totaling five or more members, a direct assessment of the attainment status of competences is conducted based on a rubric along with the dissertation review, and the steering committee conducts the final evaluation of the student's competence achievement.</td></tr>
<tr><td>Evaluation Criteria for Degree Theses/ Dissertations</td><td colspan="2">Dissertations for which all of the following evaluation items are deemed to be valid or achieved will be accepted as a doctoral dissertation upon final examination or confirmation of academic ability.
1. Novelty and significance of the research theme
2. Grasping and understanding of prior research
3. Validity of the research method
4. Conclusions and the validity of the logic leading to them
5. Novelty and originality of conclusions
6. Adequacy of style and organization
7. Appropriate citation of documents and materials
8. Academic contribution</td></tr>
</table>

	The method of dissertation examination shall be as follows. Dissertation reviews are conducted by the Dissertation review committee, which is established for each dissertation, after comprehensively judging the content of the dissertation, the presentation of the dissertation in public, and the final examination 1) In principle, the dissertation review committee shall consist of one primary examiner and four or more secondary examiners, including one expert outside the degree program (a faculty member of another degree program within the university, a faculty member in charge of a graduate school at another university, or a researcher at a research institution). 2) Doctoral dissertation defense will be approximately 60 minutes in length, including questions and answers. 3) The final examination will be oral or written, focusing on the dissertation and its related fields. The examination will be closed to the public and will be approximately 60 minutes in length.

Curriculum Policy

The purpose of this program is to foster individuals who will be involved in research to utilize information in various human activities such as academics, education, daily life, and culture through an interdisciplinary approach that integrates the humanities and sciences, and to provide them with the general and specialized knowledge and abilities described in the Diploma Policy.
Curriculum in both Japanese and English for students who enrolled in either the spring semester (April) or the fall semester (October), will be developed in an integrated manner.

Curriculum Design Framework	– The curriculum consists of the Research Seminar Courses and Research Practice Courses unique to this degree program. – The Research Seminar Courses consist of Informatics Seminar, Synthetic Seminar on Informatics I, Synthetic Seminar on Informatics II and Synthetic Seminar on Informatics III taught by advisors. The Informatics Seminar provides interactive research guidance to help students acquire communication competence, internationality competence, and expertise in informatics etc. In the Synthetic Seminar on Informatics, students receive research guidance to acquire the Competence of knowledge creation, management skills, research skills and a sense of ethics in informatics. – The Research Practice Courses group consists of Research Instruction, PBL, and Research Internship, MDA-related courses. In Research Instruction, students are expected to acquire leadership competence and ethics in informatics etc. by supervising the graduation research of students under the supervision of their academic advisors, assuming that they will become university faculty members in the future. Internships allow students to acquire practical research methods and leadership competence etc. by engaging in research activities at organizations other than the degree program to which they belong, such as international research institutions, national laboratories, corporate laboratories, and university laboratories. – Each subject is evaluated according to the evaluation method described in the syllabus.

Teaching and Learning Methods	– Graduate General Education Courses, Interdisciplinary Foundation Courses, Degree Programs' Common Courses and lecture courses of other graduate schools or degree programs of the University are selected and studied as necessary. – In the Research Seminar Courses, students solidify the foundation of their research in Synthetic Seminar on Informatics I, come into contact with research from various fields in Informatics Seminar, and consolidate their research results in Synthetic Seminar on Informatics II and III. – 2 or more credits from Research Practice Courses will be selected and studied as necessary. – Regardless of the entrance examination category and the instructional language, the prescribed credits may be included in the completion requirements.

Admission Policy

Desired Student Profile	– Individuals who strive with a sense of purpose to take an interdisciplinary approach to the formulation and resolution of problems concerning the utilization of information. – Individuals who have sufficient fundamental skills, communication skills, presentation skills, and language skills to be active internationally. – Individuals who are capable of planning a research schedule, conducting the research, and finally, building on research outcomes.
Student Selection Process	Selection will be based on a comprehensive evaluation that includes the oral examination results and the application review. Apart from the General Selection Process, there are several other selection processes: the Special Selection Process for Recommended Applicants for those who have obtained a master's degree with research achievements or who are expected to obtain a master's degree with excellent grades, the Special Selection for Working Individuals for those work working experience, and the Special Selection Process of Global Individuals in English for those entering the program in October.

Learning Support Framework

Academic Support	– The doctoral program (Seminar course) “Project Based Learning” provides practical content that enables students to manage their own research progress and acquire the skills to appropriately revise their plans with advice from their instructors. – In the doctoral program (Seminar/required course) “Informatics Seminar”, multiple presentation opportunities are provided to support time management for writing doctoral dissertations, and students are required to draw a roadmap to obtaining their degree in their presentations. In addition, there are opportunities to receive direct advice on this roadmap from all faculty members who are qualified to supervise doctoral programs and students.

Opportunities for Peer Interaction	– The Doctoral program (Seminar course) “Informatics Seminar” (seminar course) fosters a peer effect towards doctoral dissertations by requiring students to write reports in which they evaluate each other's research presentations. – In the Doctoral program (Seminar course) “Research Supervision Practice”, students present and discuss laboratory management and research supervision methods. – Student tutors are assigned to international students.
Opportunities for Student–Faculty Interaction	– Student meetings are held jointly for master's and doctoral students, allowing them to freely exchange opinions about Informatics degree program. – Multiple faculty members provide group guidance with the aim of discussing each other's research progress and receiving advice from different perspectives. – The doctoral program (Seminar course) “Informatics Seminar”, requires the attendance of all faculty members qualified to supervise doctoral program research, and serves as a forum for discussion that allows students and faculty to exchange research ideas across research laboratories. – Students can participate in a lunch colloquium held approximately once a month to promote interdisciplinary research, providing an opportunity for them to discuss the latest research topics with faculty members.

Approaches to Assuring and Enhancing Educational Quality

As part of the degree program, a PDCA cycle has been established that refers to direct assessment data of competences from the previous year and leads to educational improvements in the following years. Specifically, under the degree program leader, the Curriculum Design Group, Research Advisory Group, and Diploma Assessment Group are formed, with regular information sharing within the steering committee ensuring coordination between the groups. As a result, a system has been established that consistently works on improving the content of curricula and research guidance based on the results of competence evaluation. Decisions and discussions within each group are first reviewed and coordinated by the steering committee, and then shared and discussed among all the faculty members at the degree program faculty meeting held once a month. Through this process, a common understanding of the educational policies and areas for improvement is formed across the entire program.

Furthermore, alongside these efforts, faculty members regularly participate in faculty development programs at the Graduate School of Comprehensive Human Sciences, strict implementation of syllabus reviews using checklists based on categories independently established by the Curriculum Design Group, and feedback is provided to the instructors of each course based on class evaluation results.

Through these processes, continuous improvement in the quality of educational practices by individual faculty members is also pursued.