Master's Program in Computer Science

Name of the degree to be conferred	Master of Engineering
Educational purpose	The Master's Program in Computer Science organizes its education and research to cultivate individuals with deep expertise in diverse areas of computer science as well as the knowledge, specialized research ability and practical work ability that work on global demands and standards, and possess both ingenuity and flexibility and can use all of these to contribute to solving the problems in a specific field by informatics approaches.
Vision of human resources development	To develop researchers and highly skilled professionals who possesses specialized knowledge and engineering abilities in a wide range of areas in computer science as well as the communication and presentation abilities for his or her area of expertise and the fundamental abilities for carrying out research and development and applying these knowledge and abilities to solve various real-world problems.

Diploma Policy

The degree of Master of Engineering 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. Research ability: The ability to identify new research questions by oneself, and to prepare and execute a plan of action to answer these questions using advanced specialized knowledge and skills in a wide range of areas in computer science	① Whether research tasks in the areas of computer science are appropriately set up ② Whether specialized skills for conducting research and development in the areas of computer science were gained ③ Whether research plans in the areas of computer science are drawn up and steadily carried out with effective outcomes
7. Specialized knowledge: Advanced specialized knowledge and skills in a wide range of areas in computer science, and the ability to use them	① Whether the fundamental knowledge in the areas of systems and information engineering is gained ② Whether the advanced specialized knowledge and skills in the areas of computer science are gained ③ Whether the specialized knowledge and skills that one possesses are appropriately used

8. Ethical view: Refined ethical view in a wide range of areas in computer science	① Whether researcher ethics and engineer ethics are understood and adhered by ② Whether human research ethics as well as formalities and/or procedures necessary for research are understood

Dissertation evaluation criteria

A thesis is accepted if all the following evaluation standards are met. Note that the review of the research outcomes of specific tasks (the "specific task research report") can take the place of the review of master's thesis.

<Criteria for degree thesis review>

1. Whether the thesis provides a clear description of the significance and positioning of the research based on the understanding of research and development trends and previous studies in the areas of computer science
2. Whether the thesis shows research outcomes accompanied by new perspectives, findings, interpretations or applied values in comparison with conventional research
3. Whether the research results are adequately discussed and sufficiently verified in reliability
4. Whether research backgrounds, purposes, methods, results, discussions and the line of reasoning are developed logically and demonstratively
5. Whether the thesis is organized in a format and style of presentation appropriate as a Master's thesis with sentence expressions appropriately used and literatures, graphics, etc. correctly cited with proper referencing.

<Criteria for specific task research report review>

1. Whether an appropriate problem set for solving problems in the field of computer science using advanced ICT is presented
2. Whether the process of practical development project planned and managed by the student to build software and system is clearly described
3. Whether the results of the research are logically and empirically demonstrated to contribute to the solution of the problem.
4. Whether the report is organized in a format and style of presentation appropriate as a research report with sentence expressions appropriately used and literatures, graphics, etc. correctly cited with proper referencing

<Criteria for final exam>

【Research ability】Whether advanced specialized knowledge and skills in a wide range of areas in computer science was gained

【Research ability】Whether new tasks are identified and a plan to solve them is drawn up and steadily carried out in one's own right

【Specialized knowledge】Whether the advanced specialized knowledge and skills in a wide range of areas in computer science and the ability to use them were gained

【Ethical view】Whether the refined ethical view in a wide range of areas in computer science was gained

【Communication competence】Whether the ability to express things accurately and clearly and make debates of expertise was gained

<Level standards required for the degree thesis or specific task research report, review board members, review method and review items, etc.>

A master's thesis review board must be organized with one chief reviewer and two or more sub-reviewers who are applicable faculty members of the Degree Programs in Systems and Information Engineering of the Graduate School.

However, where required, faculty members of other Degree Programs or other university graduate schools or laboratory researchers, etc. can serve as sub-reviewers.

The chief reviewer must be the research supervisor. As the sub-reviewers, two or more applicable faculty members of the Degree Programs in Systems and Information Engineering of the Graduate School must be included.

The chief reviewer opens a master's thesis review board, and the board reviews the thesis or research report in accordance with the criteria to judge the acceptance of the thesis or research report.

The thesis passes if approved to be on a master's thesis level in all of the above evaluation items 1 to 5 with the final (oral) exam included in the judgment.

The curriculum is organized to provide students with the specialized knowledge and research ability in mathematical informatics engineering, intelligence software, software systems, computer engineering, media engineering and intelligence/information engineering. These fields cover from the basal technologies intended for the generation, processing, and utilization of "information", such as computers, networks, and security, to the applied technologies, such as web applications, user interfaces, speech recognition/image analysis and high-performance computing. In addition, students gain a wide range of basic knowledge and ethical view in the areas of engineering. The program also offers research supervision to aid in the development of Master's thesis. The facility cultivates human resources able to identify and solve problems from a wide perspective extending over multiple areas in science and technology.

Curriculum organization policy	・The Master's Program in Computer Science organizes Major Subjects and Foundation Subjects for Major in Degree Programs' Common Courses and in Program subjects. ・With the "required subjects in Program subjects" and "Foundation Subjects for Major in Degree Programs' Common Courses", students gain fundamental engineering abilities. ・With "Degree Programs' Common Courses", students gain the knowledge and skills in the areas of information science. ・With the "required subjects in Program subjects", students are engaged in research activities in the area of expertise under the advice of supervisors. Through these, students gain knowledge and skills in the areas of information science, the inquisitive quality for the area of expertise, presentation ability and the knowledge and skills in science and technology in addition to the Competence of knowledge application, Management competence, Communication competence and Teamwork competence. ・With the "Foundation Subjects for Major in Degree Programs' Common Courses", the following abilities are gained: 　- With "Experiment Design in Computer Sciences", students gain Competence of knowledge application, Management competence, Competence in Internationality, the knowledge and skills in the areas of information science, and the inquisitive quality for the area of expertise. 　- With "Instructional Design", students gain Communication competence and presentation ability. ・With seminars and "Mid-term Presentation of Master's Thesis", students gain presentation experience. With "Project Practice Workshop" and "Initiative Project I/II", students gain software development skills and cultivate Communication ability and teamwork skills. ・With "Graduate General Education Courses", "Interdisciplinary Foundation Courses", "Degree Programs' Common Courses", etc. students gain the knowledge in a wide range of areas including the areas of information science. ・Through TA (Teaching Assistant) activities, supervising the research activities of junior students in their laboratories, etc., students gain management experience.
Learning methods・Processes	・Each student sets up research tasks in their respective areas of expertise and proceeds with conducting research under the advice of supervisors. ・Students take "specialized foundation subjects in Degree Programs' Common Courses" and "Graduate General Education Courses" to gain generic knowledge, abilities, etc., and "Interdisciplinary Foundation Courses", "Degree Programs' Common Courses" and "Program subjects" to gain specialized knowledge and ability, etc. ・"Project Practice Workshop", "Initiative Project I/II", etc., help students improve group skill and communication ability. ・Obtained research findings are presented in seminars and "Mid-term Presentation of Master's Thesis" to have feedback from participating students and faculty members and to be presented in research meetings inside and outside Japan or in academic journals, etc. ・"Internship I/II", with which students participate in internships at companies, research institutes, etc., helps students improve communication ability, etc.

Evaluation of learning outcomes	・Learning outcomes are evaluated based on the "achievement evaluation sheet" . ・In the seminar of the first year, the student presents the research outcomes that are available at that point and receives evaluation and feedback. ・At the end of the first year, the student checks the achievement evaluation sheet together with supervisors to check the achievements at that point of time and review the learning plan for the second year. ・At the "Mid-term Presentation of Master's Thesis" in the second year, the student receives interim evaluation and feedback on the research outcomes for Master's thesis creation. ・At the final exam, final thesis examination is administered with the student's presentation about the degree thesis content, and the review board checks the achievement evaluation sheet.
Admission Policy	
Desired students	The Master's Program in Computer Science widely seeks candidates inside and outside Japan who possess basic skills in the areas of information science and mathematics and have a keen desire to gain the specialized knowledge, engineering skills, fundamental research and development abilities and practical abilities in the areas of information science or the areas of mathematics of information in the Graduate School.
Selection policy	・To accept outstanding and diverse human resources inside and outside Tsukuba, candidates are solicited through multiple entrance exam channels including recommendation entrance exam, general entrance exam and special selection of working students at different timings and different numbers of students admitted. ・To prove foreign language proficiency, candidates are required to submit the score sheet of English language test (e.g. TOEIC, TOEFL). ・In the general entrance exam, recommendation entrance exam and special entrance exam for working students, candidates are evaluated through document screening and an oral exam so that the candidates can be comprehensively evaluated, including their communication and presentation abilities, etc.