Graduate School of Engineering Science

Educational Objectives

In line with the Educational Objectives of Osaka University, the Graduate School of Engineering Science has endeavored to develop multidisciplinary fields of study and create new academic disciplines under the philosophy of “Fundamentally developing scientific technology by a fusion of science and engineering will create the true culture of humanity.” Based on this philosophy, we aim to nurture engineers and researchers who can play an active role in a wide variety of fields of science and technology, and who can take leadership in Japan and international society. Accordingly, the education at the Graduate School of Engineering Science is designed to train students as high-caliber professionals with the following competencies: 1) cutting-edge, advanced knowledge and skills in the field of specialty; 2) outstanding academic expertise related to the fields of science and technology; 3) broad-based, interdisciplinary academic expertise and creative thinking; 4) advanced broad-based knowledge and deep critical thinking; 5) the ability to think about things from multifaceted and comprehensive perspectives and conduct multi-angle evaluations that facilitate understanding of a broad range of disciplines; 6) profound knowledge in different languages, cultures, specialties and an international mindset that allow one to understand and discuss a diverse range of essential and complex problems in society and academia beyond those differences; and 7) design prowess that allows one to identify a diverse range of essential and complex problems, and plan a path to solve them while communicating with people in various fields, from the viewpoint of integrating science and technology and developing new multidisciplinary fields of study.

Cutting-edge, advanced specialized knowledge and outstanding academic expertise

- Acquire cutting-edge, outstanding academic expertise and skills in the field of specialty.
- Acquire interdisciplinary specialized knowledge and academic expertise in a variety of fields ranging from science to technology.
- Develop the ability to apply cutting-edge, advanced skills in the field of specialty for identifying and solving problems.
- Acquire interdisciplinary creative thinking and problem-analysis skills that allow one to contribute to integrating science and technology and developing multidisciplinary fields of study.

Advanced broad-based knowledge and deep critical thinking

- Acquire advanced broad-based knowledge and deep critical thinking that facilitate understanding of a broad range of disciplines.
- Contribute to integrating science and technology and developing multidisciplinary fields of study.
- Develop the ability to think about fundamental problems in society and academia, from multifaceted and comprehensive viewpoints.
- Develop the ability to conduct multi-angle evaluations, based on broad-based advanced knowledge with a view to integrating science and technology and developing multidisciplinary fields of study.

Sophisticated international mindset

- Develop a deep understanding of different languages, cultures and specialties, and a diverse range of essential and complex problems in society and academia, with a view to contributing to integrating science and technology and developing multidisciplinary fields of study.

- Develop the ability to interact with people with various backgrounds beyond differences in language, culture and specialty, with a view to contributing to integrating science and technology and developing multidisciplinary fields of study.

Advanced design prowess

- Develop the ability to identify a diverse range of essential and complex problems in society and academia and devise approaches to answer those problems, with a view to contributing to integrating science and technology and developing multidisciplinary fields of study.
- Develop the ability to work in cooperation and share knowledge with people in various fields to identify and solve a diverse range of essential and complex problems in society and academia, with a view to contributing to integrating science and technology and developing multidisciplinary fields of study.

Degree Awarding Policy (Diploma Policy)

Under the Diploma Policy of Osaka University, the Graduate School of Engineering Science confers a Master's Degree in Engineering on individuals who have been enrolled in the master's degree program for the required number of years, earned the stipulated number of credits in the specified subjects in the field of specialty, and passed the review of the master's thesis written under research guidance of a supervisor and the final examination. A Doctoral Degree in Philosophy in Engineering or Philosophy in Science is conferred on individuals who have been enrolled in the doctoral degree program for the required number of years, earned the stipulated number of credits in the specified subjects in the field of specialty, and passed the review of the doctoral dissertation and the final examination.

Cutting-edge, advanced specialized knowledge and outstanding academic expertise

Master's degree program:

- Acquired cutting-edge, outstanding academic expertise and skills in the field of specialty.
- Developed the ability to write the master's thesis that can contribute to the progress of the field of specialty.
- Presented and discussed the master's thesis research at a thesis presentation meeting and review meeting in a suitably academic manner.

Doctoral degree program:

- Developed the ability to discuss how their research can contribute to social and academic benefits.
- Presented and discussed the doctoral dissertation research at a dissertation presentation meeting and review meeting in a suitably academic manner.
- Acquired the ability to conduct research independently while building on advanced knowledge in the field of doctoral dissertation research and science and technology in general.

Advanced broad-based knowledge and deep critical thinking

- Built on cutting-edge, outstanding academic expertise and skills in the field of specialty.
- Acquired advanced knowledge in science and technology, as well as advanced broad-based knowledge and deep critical thinking in other fields.
- Acquired multifaceted and comprehensive viewpoints.
- Developed the ability to identify to solve a diverse range of essential and complex problems in society and academia that affect integrating science and technology, and conducted multi-angle evaluations in multidisciplinary fields of study.

Sophisticated international mindset

- Developed a deep understanding of different languages, cultures and specialties from a broad-based, international viewpoint.
- Developed the ability to discuss and interact with essential and complex problems in society and academia beyond the differences in different languages, cultures, and specialties, from the perspective of developing complex multidisciplinary fields in the fusion of science and technology.

Advanced design prowess

- Developed the ability to identify a diverse range of essential and complex problems in society and academia from the perspective of developing complex multidisciplinary fields in the fusion of science and technology, and devised approaches to answer those problems, while building on cutting-edge, outstanding expertise and skills in the field of specialty, interdisciplinary broad-based academic expertise and a sophisticated international mindset.
- Developed the ability to work in cooperation with people in various fields and used one's knowledge to identify to solve a diverse range of essential and complex problems in society and academia from the perspective of developing complex multidisciplinary fields in the fusion of science and technology, while building on cutting-edge, outstanding expertise and skills in the field of specialty and interdisciplinary broad-based academic expertise and a sophisticated international mindset.

Teaching and Learning Policy (Curriculum Policy)

In line with the Curriculum Policy of Osaka University, and under its motto, “Fundamentally developing scientific technology by a fusion of science and engineering will create the true culture of humanity,” the Graduate School of Engineering Science offers a curriculum: “Basic subjects” to acquire cutting-edge, advanced knowledge and skills in the field of specialty; “Border subjects” to deepen academic expertise in related fields; and “Interdisciplinary subjects” to acquire advanced broad-based knowledge, deep critical thinking and an international mindset. Through these subjects, students are guided to develop the ability to cultivate multidisciplinary fields of study and create new academic disciplines based on advanced specialized knowledge and broad-based perspectives.

< Principles of Curriculum Design >

Students are educated as follows: “Basic subjects” to acquire cutting-edge, advanced knowledge and skills in the field of specialty; “Border subjects” to combine the field of specialty with its related fields; and “Interdisciplinary subjects” to develop advanced broad-based knowledge, deep critical thinking and an international mindset. The education at the Graduate School of Engineering Science places importance on research to enable students to develop the ability to establish a research theme: formulating a research plan, promoting the research on their own, explaining, presenting and evaluating research results from multifaceted perspectives, with a strong sense of ethics. Advanced Liberal Arts and advanced Global Literacy education subjects, as well as subjects offered under the Program for Leading Graduate Schools also help students develop broad-based knowledge, deep critical thinking, an international mindset and design prowess.

< Contents and Methods of Education >

In “Basic subjects,” students receive lectures and exercises with a high degree of specialization in their majors, and conduct research on cutting-edge issues. In “Border subjects,” students acquire deep academic expertise in related fields of study through lectures and seminars, while in “Interdisciplinary subjects,” students gain advanced education and international experience through lectures, exercises, and practical work experience inside and outside the university including overseas.

< Academic Performance Evaluation Method >

With the aim of nurturing outstanding leaders capable of overcoming difficulties and making unceasing efforts to tackle daunting tasks, the Graduate School of Engineering Science evaluates the academic performance of students by assessing the level of achievement of learning goals, specified in the syllabus from multiple angles, and awards credits accordingly. The evaluation is based on the following methods: 1) reports and examinations for lecture-based subjects, 2) reports and oral examinations for seminar- and practical training-based subjects, and 3) reports, oral examinations, and research presentations for subjects taught in an active-learning style, including research in each priority area, laboratory rotation, overseas training in engineering science studies, and internships. Students with outstanding academic performance may complete the master’s or doctoral degree program in a shorter period than the standard period of study, if approved by the Committee of the Graduate School of Engineering Science.