

## Educational purpose

To develop global human resources with the extensive knowledge needed to realize a sustainable society, and having specialties from the basics to applications of science and technology, flexibility in thinking, competencies for intellectual creativity with problem finding and solving skills, broad perspectives, enriched sense of humanity, and collaboration skills to work in teams, all with a view to contributing to the international society.

# College of Engineering Sciences

## ■ Bachelor of Engineering

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### ■ Educational purpose ■

We foster engineers and researchers with enriched creativity who understand the fundamental principles for science and technology that constitute a foundation for the most advanced engineering necessary for continuing to maintain and develop our society and who are able to develop such science and technology.

### ■ Desired students ■

Personnel with mathematic and logical ways of thinking that constitute a foundation for understanding fundamental principles in advanced science and with basic scientific knowledge in physics, chemistry, etc. who are interested in advanced engineering applications are desired.

College of Mathematics

College of Physics

College of Chemistry

College of Engineering Sciences

College of Engineering Systems

College of Policy and Planning Sciences

Bachelor's Program in Interdisciplinary Engineering

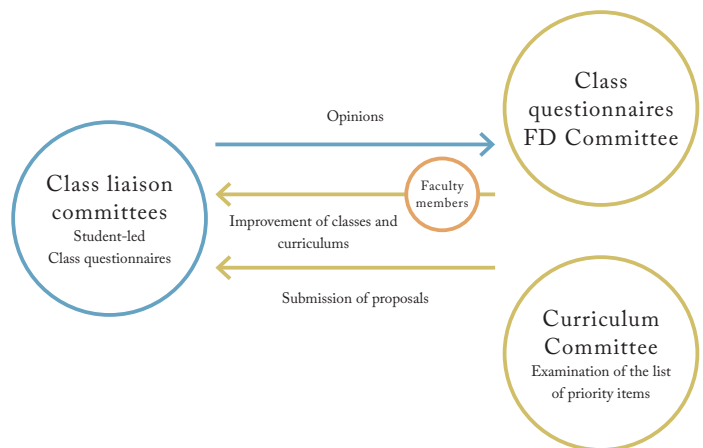
## Measures to ensure and improve the quality of education

In order to understand the rapidly evolving advanced technology, it is essential to review the educational contents from time to time. Therefore, we improve our educational abilities through the following measures.

For the Foundation Subjects for Major (i.e., mathematics, physics, chemistry), which are the common foundation for all engineering fields, as well as for the specialized common core courses, we conduct class questionnaires and work on educational improvement through the Curriculum Committee meetings held three times a year and the FD Committee meetings. Discussions are made based on comments from students, and the results of the questionnaires are fed back to improve classes and are used to enhance the educational abilities of the faculty. For all classes, from Foundation Subjects for Major to Major Subjects, a list of priority items to be learned in each class is created, which is used by the Curriculum Committee to review the continuity between courses and class contents as needed. The results of student-led class questionnaire surveys are also used to improve the classes from the students' perspective.

In the four-class system, class advisers play a central role in providing detailed follow-up to students who are not doing well academically.

### Measures to improve educational abilities



# Bachelor of Engineering

## Diploma Policy

We grant diplomas for Bachelor of Engineering to persons who have acquired the knowledge and abilities (that is, Generic Competences) to become learned based on the educational purpose for undergraduate students of the University of Tsukuba. Such persons are required to obtain basic abilities (i.e., abilities for understanding physics, chemistry, and biology, and those for mathematical logics and calculation) as well as specialized skills (i.e., from among “applied physics and measurement,” “electronics and quantum engineering and nanoscience,” “condensed matter physics and materials engineering,” and “materials and molecular engineering and multidisciplinary chemistry,” one or multiplicity of the four aforementioned types of knowledge as well as logical ways of thinking). This allows the handling of various problems in the field of engineering involving knowledge and abilities (that is, professional competences) to be learned based on the educational purpose of our school and college. In their learning outcomes, students have achieved the following goals based on the educational purpose of our school and college.

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Students have acquired basic academic skills that allow them to understand fundamental principles the most advanced science technology at atomic and molecular level. Furthermore, such students have also obtained specialized knowledge that allows them to develop and create the aforementioned basic academic skills.

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Students are able to logically think about various problems that they confront in the course of science technology from an interdisciplinary vantage and wide-ranging viewpoints in physics, chemistry, and biology.

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Students have acquired cooperation abilities that allow them to play active parts vigorously in a team and abilities that allow them to express themselves through communicating with people in different fields.

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Students have acquired language proficiency and presentation abilities that allow them to play vigorous active roles internationally.

## Curriculum Policy

We organize and implement curricula based on the following policies for programs that allow students to acquire basic abilities and logical ways of thinking for handling various problems in the field of engineering and learning outcomes related to Bachelor of Engineering.

### General policy

In the highly advanced modern society, the mission of college education is to return outcomes from natural science from the technical aspect and contribute the same to the society. In order to do so, we offer an educational curriculum for acquiring basic academic skills essential for understanding and developing fundamental principles for advanced science technology, specialized knowledge for the most advanced science and technology, and a sense of the international milieu.

### Course sequence policy

We offer education that emphasizes mathematics, physics, and chemistry in order for students to foster basic and logical ways of thinking for understanding the most advanced science by the second year. In particular, students sufficiently experience seminars during the second year. We allow for the fostering of calculation abilities and processing abilities as well as logical ways of thinking. In addition to experience and experiment-related learning for basic science, we have mandatory experiment sessions for physics and chemistry in which students can cultivate cooperativeness during the second year. Moreover, through introductory and general lectures in specialized fields, we offer education in specialized fields after the third year. During the third year, in order to respond to science technology that continues to be developed in an advanced manner, we provide four major courses (i.e., Applied Physics, Quantum and Electronic Engineering, Applied Condensed Matter Physics, and Materials and Molecular Engineering). In this way, we offer students highly specialized lectures

and experiment subjects. We provide major courses giving consideration to desires of students to the maximum extent possible. During the fourth year, all students are assigned to relevant seminars and laboratories by college faculty members. In addition to classes, students engage in graduation project and thesis. We foster abilities for carrying out proactive learning, which constitute research for discovering students' own value.

### Implementation policy

We offer specialized subjects that constitute the foundations of each field (i.e., physics, chemistry, and biology) as specialized shared core subjects. We offer students a wide variety of viewpoint that allow students to gain a vantage regarding matters in a cross-sectional manner. Moreover, we continuously offer specialized English education until the third year. In this way, we provide education that enhances language proficiency and

a sense of internationality for students.

### Policy for evaluation of learning outcomes

We evaluate students based on the following points: (i) they have acquired credits for subjects in line with curriculum; (ii) they have acquired generic and professional competences; and (iii) they have retained insights, extensive viewpoints, and abilities for solution of issues that are suitable for Bachelor of Engineering. In the Graduation Project and Thesis, we evaluate students from the viewpoints of abilities for discovery of problems, problem-solving abilities, abilities for research implementation, etc. In the presentation of the Graduation Project and Thesis, we confirm presentation and communication abilities as well as abilities for dealing with questions, etc. and we comprehensively evaluate whether or not and general and professional competences have been fostered.

Structure of competencies to be developed and curriculums

