

## 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 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

# College of Engineering Systems

## ■ Bachelor of Engineering

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### ■ Educational Purpose ■

Human resources who can support and lead safe, secure, comfortable, affluent, and sustainable human life from an engineering perspective, i.e.

1. basic skills that can be applied to a wide range of fields
2. the ability to carry out work with a broad perspective
3. basic human skills as a member of society and a professional

We train engineers and researchers who have acquired the skills and the ability.

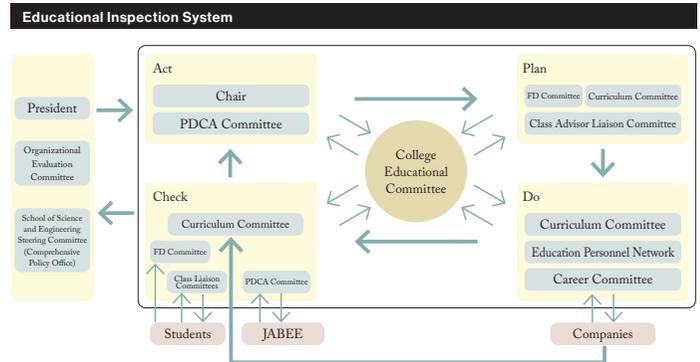
### ■ Desired Students ■

Students admitted to College of Engineering Systems are expected to have the following

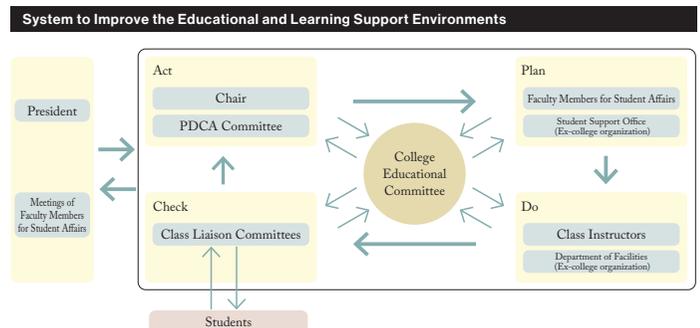
- (1) to have the basic academic skills and sense required for engineering.
- (2) to be full of curiosity and a desire to learn.
- (3) to have a clear sense of purpose to become an engineer.
- (4) to acquire excellent thinking, judgment, and expression skills and communication skills.

## Measures to Ensure and Improve the Quality of Education

Practice of PDCA cycle and FD activities: We organize curricula to achieve educational goals (Plan) and conduct classes based on syllabi (Do). At the end of each course, a class questionnaire survey is conducted (Check) to examine the effectiveness of the course and to examine the content improvement (Act). With the establishment of the educational inspection system (shown in the figure below), use of the PDCA cycle and the college faculty development (FD) activities aimed at improving class methods, we are constantly examining and improving our whole education system.



Improvement of the educational and learning support environments: We have established a system for improvement of the educational and learning support environments (see the figure below). The university obtains facilities, equipment and systems necessary for conducting education and supporting student learning by referring to the opinions of students and take necessary measures to maintain, operate and update them.



JABEE-accredited colleges: In 2004, College of Engineering Systems is accredited by Japan Accreditation Board for Engineering Education (JABEE) as a JABEE program in the Field for Multi- and/or Trans- disciplinary Engineering and New-disciplinary Engineering. In addition, our graduates have been recognized as engineers who have completed engineering education at the international level (Washington Accord) since 2005.

# Bachelor of Engineering

## Diploma Policy

A bachelor's degree in engineering will be awarded to students who have acquired knowledge and abilities (i.e., General Competence) based on the educational objectives of the University of Tsukuba's Bachelor's Program, and who have acquired the basic skills and logical thinking abilities to deal with various problems in the field of engineering based on the educational purposes of School of Science and Engineering and College of Engineering Systems.

In terms of basic abilities that can be applied to a wide range of fields, students are required to acquire specialized basic subjects related to mathematics, physics, and computers, and to be able to apply this knowledge to analyze various engineering problems. Specifically, students are expected to acquire the ability to think and analyze logically and mathematically, to deepen their understanding of physical and natural phenomena, and to acquire the ability to get and process information using computers.

In terms of the ability to carry out work with a broad perspective, students are expected to master the specialized subjects of each major, acquire the latest knowledge, understand the relationship between science and technology and society, the world, and the entire globe, and be able to plan new technologies and design and operate specific systems. In addition, students are expected to be able to devise concrete solutions to problems and carry out their work systematically through cooperation with their classmates and guidance from their supervisors in experiments and graduation research.

In terms of basic human skills as a member of society and a professional, students are required to acquire subjects such as foreign languages, experiments, and graduation research, and to acquire communication skills that will enable them to be active internationally, as well as presentation skills that will enable them to express their ideas in a logical and easy-to-understand manner to a third party. In addition, students are expected to possess a sense of responsibility and ethics as well as social skills as engineers, along with initiative and the ability to take action.

## Curriculum Policy

The program is designed to enable students to acquire the basic skills and logical thinking abilities to deal with various problems in the field of engineering and to achieve the goal of a bachelor's degree in engineering.

### General policy

This college covers an extremely wide range of engineering fields, and consists of two majors: the major in Intelligent Engineering Systems and the major in Engineering Mechanics and Energy. Although there are some differences in the content of study in each major, it is easy to take courses in the other major, and there are no barriers to major assignment in the final year of study. The curriculum is designed to emphasize cross-disciplinarity as much as possible while maintaining some differences in expertise among majors.

### Course sequence policy

In the first and second years, students study the concept of "engineering systems," which is a cross-sectional approach to engineering fields, and develop basic skills that can be applied to any major in College of Engineering Systems, through a curriculum system that allows students to study a variety of specialized fields in a cross-sectional manner.

From the fall semester of the second year, students are divided into two majors, where they can select distinctive courses in a variety of specialized fields and acquire in-depth specialized knowledge.

In the second and third years, through the completion of basic, specialized, and applied experiments in each major and related specialized subjects, students develop the integrated creative solution skills necessary to design various systems. In addition, all experiments are conducted in group units, which helps students to cultivate teamwork skills.

In the fourth year, students are assigned to a laboratory of their choice in the college without

**Structure of Majors**

- Intelligent Engineering Systems**
  - Informatics
  - Artificial Intelligence
  - Risk Engineering
  - Electrical and Electronic Engineering
  - Communication Engineering
  - Control Engineering
  - Mechanical Engineering
  - Systems Engineering
  - Cybernetics
  - Robotic Engineering
- Engineering Mechanics and Energy**
  - Architectonics
  - Mechanical Engineering
  - Civil Engineering
  - Materials Engineering
  - Aerospace Engineering
  - Informatics
  - Risk Engineering
  - Energy Science
  - Electrical and Electronic Engineering
  - Nuclear Engineering

being limited to their major field of study, and complete their graduation research using the basic skills and broad range of specialized knowledge they have acquired. Students complete their graduation research by utilizing their acquired basic skills and a wide range of specialized knowledge. In this way, we foster engineers with the ability to construct engineering systems that are useful in people's lives. In addition, students with excellent grades up to the second year can graduate early by conducting special graduation research in the third year.

**Implementation policy**

In order to ensure the level of education demanded by society, we actively appoint part-

time lecturers from industry in several specialized subjects, such as practical business, and we also offer specialized English courses taught by foreign faculty. In addition, we have a sufficient number of laboratories and equipment for the experiments and exercises conducted in each year, as well as a large-scale programming laboratory that can be used by many students simultaneously. In addition, each semester, the class teachers conduct personal interviews with students to provide detailed guidance for their studies.

**Policy for evaluation of learning outcomes**

Grading is conducted strictly in accordance with the syllabus, and the grading process is recorded.

**Curriculum structure**

