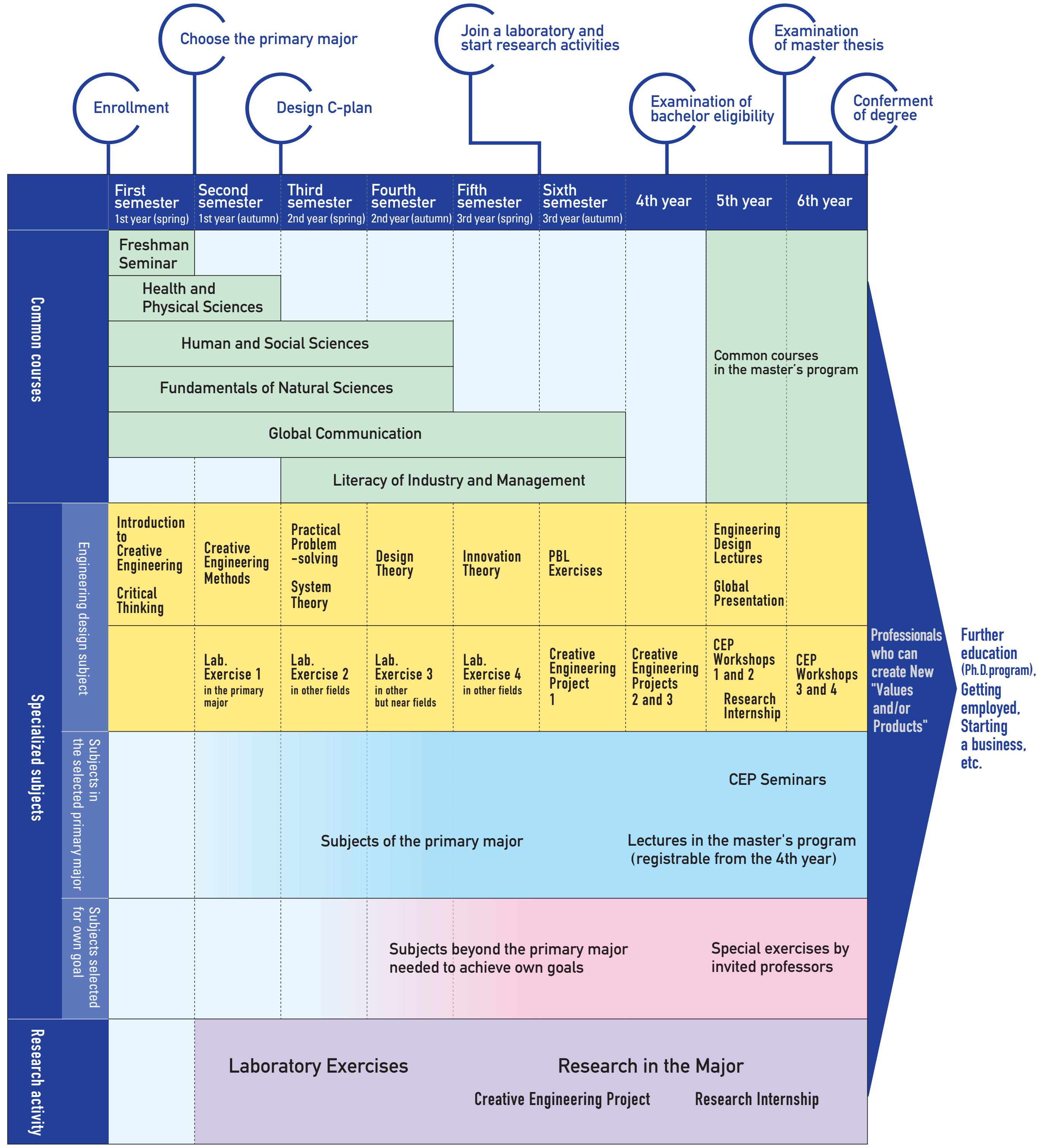
Timeline from Enrollment to Graduation

CEP is a 6-year integrated course, seamlessly connecting the 4-year undergraduate course to a 2-year master course. In the first year, every student chooses his/her primary major based on his/her interest and also determines their goal of learning and "C-plan" with a mentor. "Laboratory Exercises" starts at the second (autumn) semester, where every student joins laboratories in several fields to experience experiments, seminars, etc. Classes of "Engineering Design", which give students various knowledge and methods for creating new values, also start at this semester. Starting in the autumn semester of the third year, all students join laboratories of their primary majors and do full-scale research activities. Until graduation at the end of the 6th year, they can perform research for more than three years in the laboratories.



Subjects for Engineering Design and Practical Experience

Students will learn subjects about engineering design as well as specialized fields. Subjects involve methods of producing products/services and solving problems in the local or the global society based on various engineering knowledge and technologies. Hands-on experiences through laboratory research on campus and at extramural facilities are also learned.

Laboratory Exercises

Students will take Laboratory Exercises 1, 2, 3 and 4 from the second to fifth semesters. Each LE offers two 2-month experiences for each student. Here, the students will perform experiments, analysis, designing and/or data processing, and present and discuss their results with senior students. Students are assigned to eight laboratories in total, within their primary major and other fields.

PBL Exercises

In PBL Exercises (Project-based learning exercises) of the sixth semester, students will tackle a larger problem with students' teams. For a given problem, students will identify issues and provide a proposal considering various aspects, including interests of stakeholders and, social and ethical points. Through PBL Exercises students will learn to build ideas through discussion with other students and also to use specialized knowledge and skills for practical problems.

Research Internship

Research Internship is a course that offers an opportunity to students to participate in research and development activities related to their own research for about three months at companies/institutes in Japan or abroad. CEP requires all students to take this course to acquire practical engineering skills from learned knowledge.
The destination of a student will be determined based on the researcher network of his/her supervisor and/or a matching process between the student and a project the destination offers.
Normally students will stay at the destination from September to November in the fifth year, i.e., the first year of master course, but it can be changed based on mutual consent.
All students are required to take the following courses in advance as a preparation for research and development: engineering ethics, research ethics, intellectual properties, and safety. All students are also required to regularly report to their supervisors during their stay and make final presentations after coming back to NITech.

Other subjects and Research

Subjects for engineering design provide students opportunities of creating new ideas as well as group discussion and presentation. These are training for laboratory research and real activities as engineers as well. Students will start research projects in a laboratory under supervision by professors in the sixth semester. Their research progresses are discussed with and evaluated by students in other fields of study at CEP Workshops.

Recruiting

CEP welcomes students having the following: wide and strong interest in engineering and technologies, spirits of academic inquiry, and communication skills enabling discussion with others.
All applicants wishing to enroll in CEP have to pass the entrance exam consisting of paper exams and an interview. The subjects of paper exams are Mathematics, Science (Physics or Chemistry), English language, and Essay.

Career after graduation

In March 2022, CEP will turn out our first graduates to the world. The graduates are expected to become creative engineers in various domains who will drive innovations by developing original products and services.

Creative Engineering Program
NAGOYA INSTITUTE OF TECHNOLOGY
http://cr.web.nitech.ac.jp/

Creative Engineering Program

Since 2016

http://cr.web.nitech.ac.jp/

NAGOYA INSTITUTE OF TECHNOLOGY
This leaflet was produced by editing a leaflet for the purpose of recruiting students for the Creative Engineering Program of NITech, in order to introduce the program to potential partner universities.

The Creative Engineering Program, a 6-year integrated undergraduate and graduate course, has started!

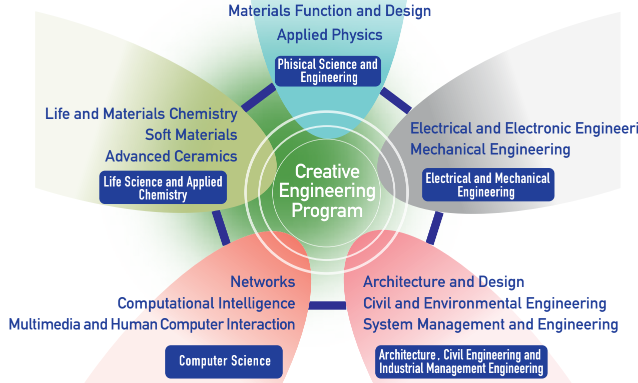
In 2016, NITech launched a new six-year integrated undergraduate and graduate course called the Creative Engineering Program (CEP).
Every student in CEP first chooses a primary major from thirteen engineering fields, but studies beyond the major for six years by designing his/her own curriculum that will establish his/her destination and future.
The curriculum will contain special classes giving broader views, such as value creation and experience-based learning, in addition to traditional engineering classes.
CEP cultivates students who will tackle problems in engineering from multiple perspectives and advance innovations by developing new products and/or services.

Six-year consecutive educational course, seamlessly connecting the 4-year undergraduate course to a 2-year master course

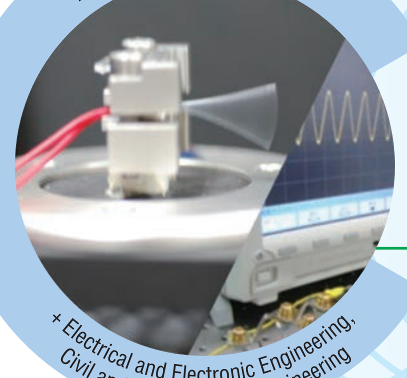
For engineering students, it is common to proceed to graduate school after graduation from their undergraduate courses.
In general, such students have to prepare for the entrance exam of the graduate school; this will cause interruptions in activities such as research projects in laboratories.
However, since CEP is a 6-year integrated course, there are no barriers between undergraduate and graduate courses.
This allows students to concentrate on studying in a laboratory for three years from the 4th year of the undergraduate course to the master course.

Beyond a major: To have a good sense in engineering

Having a good engineering sense requires views and creativity backed by wide and deep knowledge.
CEP cultivates such engineers based upon the properties of NITech, where all domains of engineering are studied.



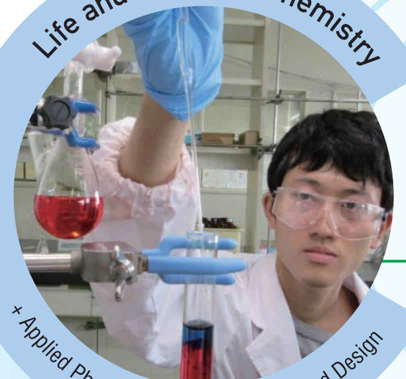
Advanced Ceramics



In addition to skills of developing new ceramic materials learned in this major, I will learn technologies in two other fields to develop power harvesting devices and rechargeable batteries and finally, I will be a material engineer supporting energy-oriented societies.

+ Electrical and Electronic Engineering, Civil and Environmental Engineering

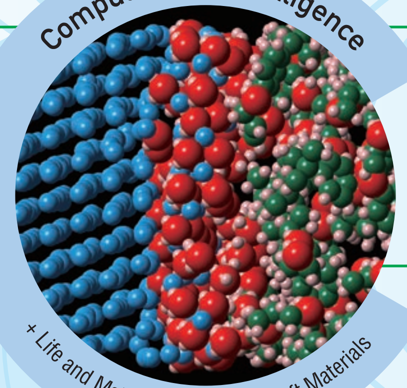
Life and Materials Chemistry



In addition to knowledge about structures and properties of materials learned in the major, I will learn technologies in the other two fields to design micro structures in molecules. It gives me skills to develop novel devices using organic compounds.

+ Applied Physics, Materials Function and Design

Computational Intelligence



In addition to knowledge-discovering technologies studied in the major, I will learn structures and properties of biomolecules studied in the other two fields to contribute to bioinformatics technologies.

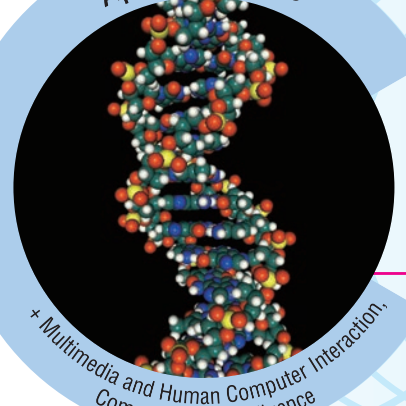
+ Life and Materials Chemistry, Soft Materials

Electrical and Electronic Engineering

In addition to technologies of electrical and electronic engineering such as electric control and energy systems, I will learn mechanical engineering such as machine control and fluid/friction dynamics and IT technologies to develop future transportation systems.

+ Mechanical Engineering, Networks

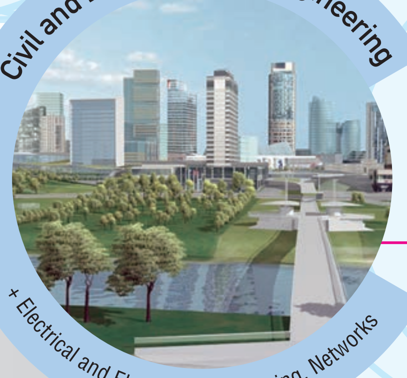
Applied Physics



In addition to technologies of atom-level simulations using supercomputers learned in the major, I will learn the other two fields to visualize the micro-world of materials and contribute to the development of functional devices under new principles.

+ Multimedia and Human Computer Interaction, Computational Intelligence

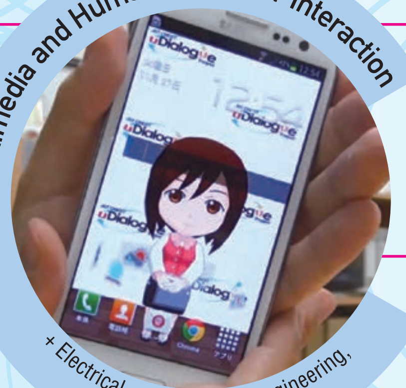
Civil and Environmental Engineering



In addition to technologies studied in the major, I will learn energy systems and next generation network technologies in the other two fields to contribute to sustainable urban design with efficient use of energy

+ Electrical and Electronic Engineering, Networks

Multimedia and Human Computer Interaction



In addition to multimedia information technologies applied to video and sound, I will learn communication technologies and cognitive science in the other two fields to develop human-friendly new communication technologies.

+ Electrical and Electronic Engineering, Computational Intelligence

Combining one of the 13 fields to the others gives various engineering challenges. Seven examples are shown here.

What is a "C-plan"?

In their first year, every student makes a curriculum plan which contains their purpose of studying in CEP, and the classes the student will take until graduation. It will also be a plan for their career as a future engineer and a plan to make creative activities. We call the plan "C-plan" because it includes three C's: Curriculum, Career, and Creativity.

Comprehensive Communication Skills

In CEP, each student has a different C-plan and studies with different interests of expertise. Every student learns comprehensive communication skills and engineering creativity through discussions with other students having various thoughts in a classroom.

Strong Support with Small-group Instruction

CEP offers various classes for students to have broad knowledge in engineering. They include "Engineering Design", "Research Internship", and "Laboratory Exercises". In "Laboratory Exercises", every student in lower years will temporarily join laboratories of several fields to have the first-hand experience of experiments.

seminars, etc. To effectively learn many fields, every student has a mentor. A mentor is a faculty member, who takes care of two students per class. The mentor strongly supports students by advising about everything in CEP, especially their C-plans and effective learning.

Thirteen engineering fields

Students select a field as a primary major and learn essential subjects in the field.

Course	Fields	Keywords	Essential subjects in the fields
Materials and Energy Course	Life and Materials Chemistry	Synthetic organic chemistry Supramolecular chemistry Interfacial science and chemistry Bio-related chemistry Medical chemistry	Basic Inorganic Chemistry; Basic Organic Chemistry; Fundamentals of Solid Chemistry; Analytical Chemistry; Fundamentals of Chemical Engineering; Polymer Chemistry; Physical Chemistry; Biochemistry; Inorganic Chemistry; Physical Chemistry Laboratory; Organic Chemistry Laboratory; and other laboratory works
	Soft Materials	Polymeric materials Functional plastics Protein, DNA Environmentally compatible polymers Environmentally benign polymer synthesis	Basic Inorganic Chemistry; Basic Organic Chemistry; Fundamentals of Solid Chemistry; Polymer Synthesis; Physical Property of Polymer; Polymer Physical Chemistry; Polymer Science; Organic Synthesis; Soft Materials Chemistry; Soft Materials Laboratory
	Advanced Ceramics	Development of sensor materials Design for artificial bone Science and technology for water remediation Design for energy conversion materials	Basic Inorganic Chemistry; Basic Organic Chemistry; Fundamentals of Solid Chemistry; Structural Chemistry of Inorganic Materials; Solid State Thermochemistry; Principles of Quantum Science; Materials Science; Structural Chemistry of Amorphous Materials; Inorganic-Organic Hybrid Chemistry; Microstructure of Ceramics; Computational Science Fundamentals; and experiments
	Materials Function and Design	Nanoparticles, Thin films Composite and functionally graded materials Iron and steels, Light metals Photodevices Energy harvesting materials	Fundamentals of Materials Science; Mathematics for Physics and Metallurgy; Physical Phenomena and Differential Equations; Thermodynamics; Crystallography and Diffraction; Quantum Mechanics; Material Physics; Equilibrium of Materials; Solid State Physics; Microstructure of Materials; Transport Phenomena; Materials Physics and Mechanics; and exercises and laboratory
	Applied Physics	Simulations using supercomputers Thin films and nanomaterials Processing technologies at the atomic level Smart materials Femtosecond lasers	Fundamentals of Materials Science; Mathematics for Physics and Metallurgy; Physical Phenomena and Differential Equations; Applied Electromagnetism; Thermodynamics; Physical Mathematics; Fine Measurement for Physics; Statistical Mechanics; Quantum Mechanics; Solid State Physics; Exercises in Mechanics and Electromagnetism; Exercises in Quantum Mechanics; and other experiments
	Electrical and Electronic Engineering	Energy systems Mechatronics System controls Wireless communication technologies Bioelectromagnetic environment	Ordinary Differential Equations; Electric Circuits; Thermodynamics; Programming; Electromagnetics; Electronic Circuits; Computer Fundamentals; Information Theory; Electronic Properties of Materials; System Control; and experiments on Electrical and Electronic Engineering
	Mechanical Engineering	Flow science Energy management Vibration controls Micro-nano mechanics Human interface	Ordinary Differential Equations; Electric Circuits; Thermodynamics; Programming; Fluid Mechanics; Strength of Materials; Theory of Mechanism; Engineering Mechanics; Mechanical Drawing; Control Engineering; Heat Transfer; Dynamics of Machinery; Introduction to Materials Science; Mechanics of Machining Processes; Mechanical Drawing; and experiments on Mechanical Engineering
Computer and Social Engineering Course	Networks	Web applications Mobile computing Image processing Algorithms Distributed systems	Introduction to Computer Systems; Probability; Programming; Mathematics for Computer Science; Information Theory; Data Structures and Algorithms; Computer Architecture; Digital Circuits; Formal Languages and Automata; and exercises for network field
	Computational Intelligence	Artificial intelligence Social computing Multi-agent systems Intelligent robotics Brain sciences	Introduction to Computer Systems; Probability; Programming; Mathematics for Computer Science; Information Theory; Data Structures and Algorithms; Computer Architecture; Digital Circuits; Formal Languages and Automata; and exercises for AI Programming
	Multimedia and Human Computer Interaction	Speech recognition and speech synthesis Image recognition and image understanding Multimedia systems 3-dimensional shape measurement Augmented reality	Introduction to Computer Systems; Probability; Programming; Mathematics for Computer Science; Information Theory; Data Structures and Algorithms; Computer Architecture; Digital Circuits; Formal Languages and Automata; Media Laboratory
	Architecture and Design	Architectural design Architectural theory and history Architectural structure and materials Architectural planning and urban planning Environmental design and figurative art	Structural Design; History of Architecture and Design; Architectural and Design Planning; Building Construction Method; Building Materials; Environmental Design; Urban Design; Presentation Tecnique; Structural + Design Seminars; Environmental Control Laboratory; Laboratory Tests of Building Materials; Architectural Design Studio + Design Workshops
	Civil and Environmental Engineering	Social infrastructure lifeline Sustainable society conservation Management urban safety design	Structural Mechanics; Concrete Materials; Environmental Hydraulics; Infrastructure Planning; Basic Geomechanics; Surveying; Information Technology in Civil Engineering; Civil Engineering Experiments; Field Exercises in Surveying
	System Management and Engineering	Risk management Critical infrastructure protection Engineer resource management Technology & product development System thinking	Probability and Statistics; Mathematical Programming; Systems Management and Engineering; Program Design; Production Management; Quality Control; Marketing Strategy; Business Environment; Psychology for Systems Management and Engineering; Societal Security Management; Exercises for Data Analysis in Business Process; and other exercises