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Appended Form 1

Specifications for Major Program
Name of School (Program) [School of Engineering Cluster 1(Mechanical Systems,
Transportation, Material and Energy)]

Program name (Japanese)	機械システムプログラム
(English)	Program of Mechanical Systems Engineering

1. Academic Degree to be Acquired : Bachelor's degree in Engineering

2. Overview

(1) Overview of "English-based Bachelor's Degree Program"

This program aims to foster and produce future members of a global society who have the knowledge to be innovative, creative, take leadership, and possess language abilities that will help them play an important role in the international world.

This program focuses specifically on producing individuals who are capable of addressing various global issues from an engineering perspective and contribute to the creation of new and valuable solutions that are significant to both the industrial and academic societies.

Students enrolled in the program will begin the curriculum from the first semester of their first year.

In the second year, students will set off on their major programs and take the designated courses which are offered at each cluster. Major program overview is as (2).

(2) Overview of "Program of Mechanical Systems Engineering"

This program offers education in the fundamentals of mechanical system engineering, the structure and function of mechanical systems and the principles of the design and processing of mechanical systems based on new concepts, computer-aided design (CAE and CAD), measurement and control technology, mechatronics technology, the principles of the design and production of new mechanical systems through intelligent numerical simulation and information processing, as well as basic fields such as the mechanics of materials, the dynamics of vibrations, system controls, and other fields. By offering such education, it aims to develop engineers who, having a broader perspective on human-machine relations and environmental issues, are able to assume cutting-edge design and development roles in production engineering. In order to provide an efficient and integrated education, the teachers belonging to the academic society (Science and Engineering Field, Machine Engineering/Science and Technology Unit) are in charge of education for this program. Students are assigned to this program in the second semester of the second year. Then, in the first semester of the fourth year, students are assigned to their respective research laboratories, choose their research topics, and write up their graduation theses.

Around sixty percent of graduates from this program will advance to graduate school. Graduates are employed in the general machinery and automotive fields, as well as in electronics, information & communications, heavy industry, the chemical industry, and a broad range of other industries. Centering on manufacturers in the fields of heavy industry, transportation equipment, machinery, and materials, they work actively in the fields of R&D, design, production engineering, and engineering marketing.

3. Academic Awards Policy (Goals of the Program and Policy for Awarding Degrees)

The Program of Mechanical Systems Engineering develops professionals capable of taking action and displaying great humanity and rationality, who can contribute to the peace, development, and survival of humankind, and to the realization of happiness while striving for co-existence with nature.

Based upon the above, this program awards a bachelor's degree in engineering to students who have acquired the following abilities in a balanced manner, as well as the number of credits necessary to meet the standard of the course.

- Acquisition of the fundamentals of mechanical system engineering, the structure and function of mechanical

system and the principles of the design and processing of mechanical systems based on new concepts, computer-aided design (CAE and CAD), measurement and control technology, mechatronics technology, the principles of the design and production of new mechanical systems through intelligent numerical simulation and information processing, as well as basic fields such as the mechanics of materials, the dynamics of vibrations, system controls, and other fields.

- The ability to assume roles in the design and development of cutting-edge production technology, while having a broader perspective about human-machine relations and environmental issues.

4. Curriculum Policy (Policy for Preparing & Implementing Curriculum)

To ensure that students are able to achieve the goals of the program, the program develops and puts into practice a curriculum based on the following policy:

- The Program offers not only basic mechanical education but also specialized education in the structure and function of mechanical systems and the principles of the design and processing of mechanical systems based on new concepts, computer-aided design (CAE and CAD), measurement and control technology, mechatronics technology, and the principles of the design and production of new mechanical systems through intelligent numerical simulation and information processing.

- In the first year, the students take Liberal Arts Education subjects such as Peace Science Courses, Basic Courses in University Education, common subjects, and Foundation Courses, as well as specialized basic subjects and specialized practical education, such as machine shop training.

- In the first semester of the second year, the students take the specialized basic subjects that are important, together with subjects common to Cluster 1 such as “Mechanics of Materials ” and “Fluid Dynamics ”. Then, from the second semester, the students take specialized subjects, such as highly professional subjects related to advanced technology that reflect the characteristics of this program, and subjects related to integrated systems technology.

- In the third year, specialized subjects become major subjects, and the students take subjects required for this program. The program tries, as far as possible, not to allocate multiple specialized subjects to the same time-slot, allowing students to take specialized subjects provided by other programs in Cluster 1 according to their personal interests.

- In the fourth year, the students are assigned to their respective research laboratories, choose their research topics, and write their graduation theses.

5. Program Timing/Acceptance Conditions

The English-based Bachelor’s Degree programs begin in the first semester of the first year. Enrollment in Program of Mechanical Systems Engineering occurs in the second semester of the second year.

Additional Requirements

To determine acceptance into the English-based Bachelor’s Degree program, all applicants are required to have an individual consultation with the faculty committee members.

By the first semester of the second year, students must have acquired the Liberal Arts Education subjects and specialized basic subjects that are commonly specified in Cluster 1.

6. Qualifications to be Acquired

Type-1 High School Teaching License (Industry)

(Students must acquire the required number of credits for the Type-1 High School Teaching License (Industry), in addition to the required number of credits for this program.)

7. Class subjects and course content

* For class subjects, see the Course List table on the attached sheet.

* For course content, see the syllabus for each fiscal year.

* All class subjects are taught in Japanese. Course materials will be written in both Japanese and English or only English.

8. Academic Achievements

At the end of each semester, the evaluation criteria are applied to each academic achievement evaluation item so that the level of attainment is clearly demonstrated. Students' grade calculation for each subject, from admission to the current semester, is given in one of three levels: "Excellent," "Very Good," and "Good," based on evaluation criteria calculated by adding the weighted values to the numerically-converted values of their academic achievement in each subject being evaluated (S = 4, A = 3, B = 2, and C = 1).

Evaluation of academic achievement	Converted values
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of cluster leader and program leader.

(2) Program assessment

Area for program assessment

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content is appropriate

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- Conducting self-assessment for each subject based on class improvement questionnaires from students who have taken course, and based on performance rating results
- Conducting questionnaires (obtained at graduation) in suitable cycles, to evaluate the validity of the goals and how it should be conducted

Search records of each student's learning status, prepared by tutors, are kept.

Based on these records, study guidance is given to each student. At the same time, requests from students are discussed at teachers' meetings as needed. Furthermore, based on the results of the course improvement questionnaires obtained from students, subject teachers draw up class improvement plans that reflect the questionnaire results.

Cluster 1 Basic Specialized Subjects

⊙ Required subject

○ Compulsory elective subject

△ Free elective subject

	Class Subjects	Credits	Type of course registration				Class Hours/Week												Note						
			Mechanical Systems Engineering	Transportation Systems	Materials Processing	Energy Transform Engineering	1st grade				2nd grade				3rd grade					4th grade					
							Spring		Fall		Spring		Fall		Spring		Fall			Spring		Fall			
							1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T		1T	2T	3T	4T		
1st group	Applied Mathematics I	2	⊙	⊙	⊙	⊙				4															
	Applied Mathematics II	2	⊙	⊙	⊙	⊙					4														
	Applied Mathematics III	2	⊙	⊙	⊙	⊙						4													
	Engineering Mathematics A	2	○		○	○								4											
	Engineering Mathematics C	2	○	⊙	○	○							4												
	Probability and Statistics	2	⊙	⊙	⊙	⊙					4														
	Synthesis of Applied Mathematics	2	○		○	○											4								
	Practice of Mechanics	1	○	△	○	○				4															
	Engineering Mechanics	2	○	△	○	○					4														
	Introduction of Mechanical and Transportation Engineering	2	⊙	⊙	⊙	⊙				4															
	Technical English	1	⊙	⊙	⊙	⊙					4														
Basic Engineering Computer Programming	2	⊙	⊙	⊙	⊙						4														
2nd group	Mechanics of Material I	2	⊙	⊙	⊙	⊙					4														
	Thermodynamics I	2	⊙	⊙	⊙	⊙					4														
	Fluid Dynamics I	2	⊙	⊙	⊙	⊙						4													
	Control Engineering I	2	⊙	⊙	⊙	⊙						4													
	An Introduction to Engineering Materials	2	⊙	⊙	⊙	⊙					4														
	Fundamentals of Materials Processing	2	⊙	⊙	⊙	⊙						4													
	Computer Programming	2	⊙	⊙	⊙	⊙								4											
	Machine Design and Drawing	1	⊙	⊙	⊙	⊙				3	3														
	Computer Aided Design	1	⊙	⊙	⊙	⊙						3	3												
	Machine Shop Training (a)	1	⊙	⊙	⊙	⊙				3	3														
	Machine Shop Training (b)	1	⊙	⊙	⊙	⊙						3	3												

※Students can select either Machine Shop Training (a) or Machine Shop Training (b)

Cluster 1 Specialized Subjects
(Program of Mechanical Systems Engineering)

- ⊙ Required subject
 ○ Compulsory elective subject
 △ Free elective subject

Class Subjects	Credits	Type of course registration	Class Hours/Week																Note	
			1st grade				2nd grade				3rd grade				4th grade					
			Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall			
			1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T		
Dynamics of Vibrations I	2	⊙							4											
Experiments in Mechanical Engineering I	1	⊙									3	3								
Experiments in Mechanical Engineering II	1	⊙											3	3						
Mechanical Engineering Design and Production	1	⊙											3	3						
Mechanical Materials I	2	○									4									
Mechanical Materials II	2	○												4						
Fracture Mechanics	2	△												4						
Fusion and Solidification Processings I	2	△									4									
Plastic Working and Powder Metallurgy II	2	△											4							
Materials Science	2	○							4											
Machining	2	⊙									4									
Fluid Dynamics II	2	○							4											
Heat Transfer I	2	○							4											
Combustion Engineering Fundamentals	2	△									4									
Internal Combustion Engines	2	△											4							
Data Processing and Numerical Analysis	2	○							4											
Theory of Elasticity and Plasticity	2	○									4									
Computational Solid Mechanics	2	○												4						
Mathematical Optimization	2	△							4											
Mechanics of Materials II	2	○							4											
Mechanism and Kinematics	2	○								4										
Dynamics of Vibrations II	2	○									4									
Control Engineering II	2	○							4											
Electrical and Electronic Engineering	2	○									4									
Mechatronics	2	○											4							
Instrumentation Engineering	2	⊙							4											
Mechanical System Control	2	○									4									
Data Structure and Algorithm	2	○												4						
Manufacturing System	2	⊙									4									
Machine Elements Design I	2	⊙							4											
Machine Elements Design II	2	○									4									
Machine Design	2	○											4							
Reliability Engineering	2	△									4									
Systems Engineering	2	○							4											
Internship	1	○											3	3						
Graduation Thesis	5	⊙																		

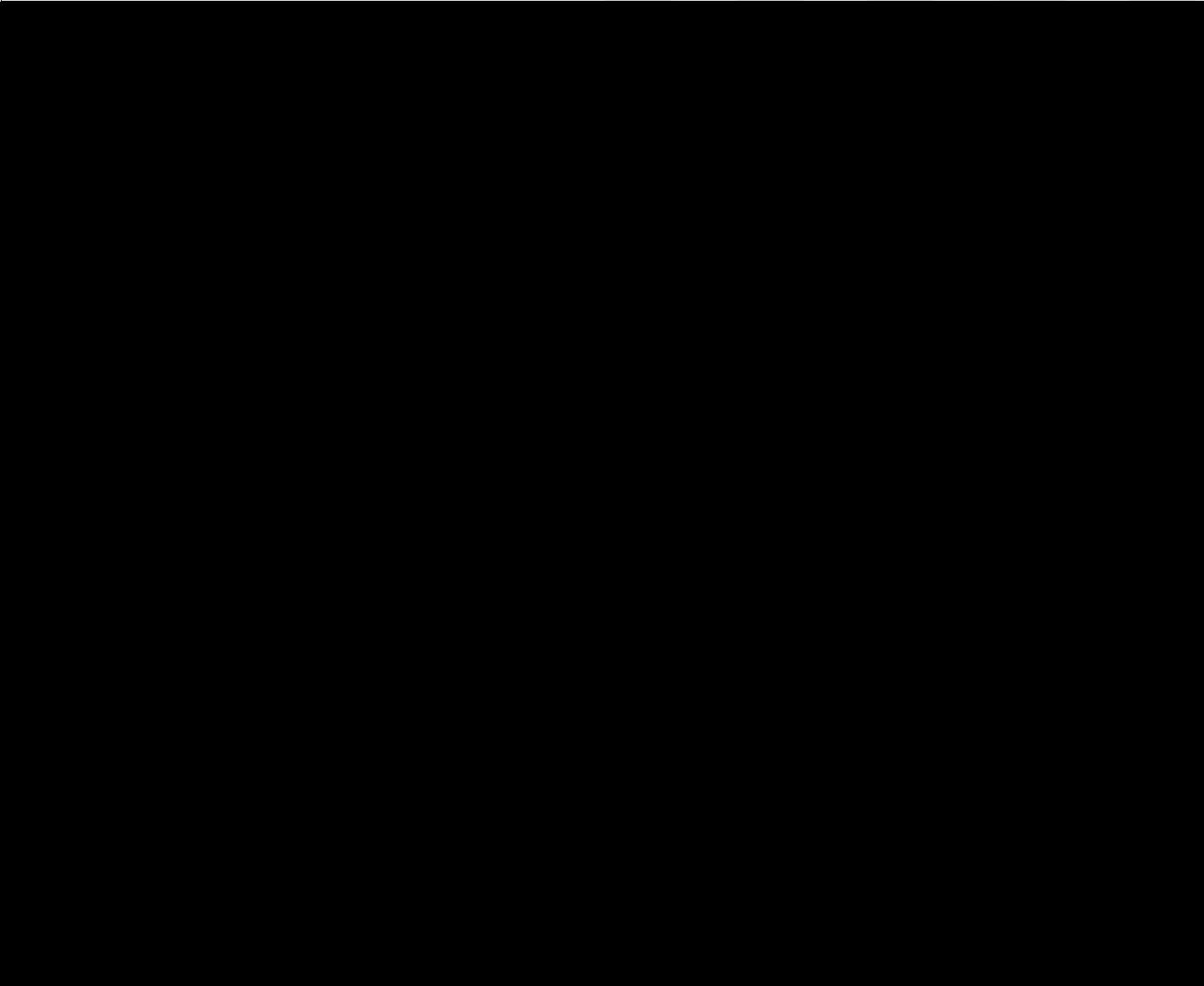
Academic Achievements in Educational Program for Mechanical Systems Engin
The Relationship between Evaluation Items and Evaluation Criteria

Academic Achievements		Evaluation Criteria		
Evaluation Items		Excellent	Very Good	Good
Knowledge and Understanding	(1) To develop the ability to work positively and independently on the development of local societies, international society, and business and industries.	To be able to be sufficiently engaged in the development of local societies, international society, and business and industry.	To be able to be engaged in the development of local societies, international society, and business and industry at the standard level.	To be able to be engaged in the development of local societies, international society, and business and industry at the minimum level.
	(2) Acquiring necessary basic knowledge for an engineer and developing the ability to consider logically.	Acquiring necessary basic knowledge for an engineer and being able to sufficiently and logically consider it.	Acquiring necessary basic knowledge for an engineer and being able to logically consider it at the standard level.	Acquiring necessary basic knowledge for an engineer and being able to logically consider it at the minimum level.
Abilities and Skills	(1) Acquiring basis of mechanical system engineering steadily and developing the applied skill.	Acquiring basis of mechanical system engineering steadily, and being able to apply it sufficiently.	Acquiring basis of mechanical system engineering steadily, and being able to apply it at the standard level.	Acquiring basis of mechanical system engineering steadily, and being able to apply it at the minimum level.
	(2) Developing the ability of solving the technological issues with flexible ideas and creativity.	Based on flexible ideas and creativity, to be able to sufficiently solve problems related to engineering.	Based on flexible ideas and creativity, to be able to independently solve problems related to engineering to the standard level.	Based on flexible ideas and creativity, to be able to independently solve problems related to engineering at the minimum level.
Overall Abilities	(1) Cultivating abilities of communication and of internationally collecting information and releasing it	To be able to communicate sufficiently with others, collect and release information internationally.	To be able to communicate with others, collect and release information internationally at the standard level	To be able to communicate with others, collect and release information internationally at the minimum level.

Placement of the Liberal Arts Education in the Major Program

We aim to cultivate a well-rounded character, backed up by a broad range of basic knowledge and an understanding of global environmental issues and problems in the social environment. Furthermore, we aim to cultivate the ability to consider ways to solve problems in the context of the multifaceted relations between people and society, and between nature and engineering. To that end, the following are offered: (1) The acquisition of the necessary abilities and attitudes to see various social issues multilaterally and to understand the complete picture (2) The acquisition of a broader perspective after being exposed to fields outside of one's area of expertise (3)

Subject type	Class subjects	credits	Type of course registration	Period	Evaluation items								Total weighted values of evaluation items in the subject		
					Knowledge and Understanding				Abilities and Skills					Comprehensive Abilities	
					(1)		(2)		(1)		(2)			(1)	
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items		Weighted values of evaluation items in the subject	Weighted values of evaluation items
Specialized Education	Machine Shop Training (a)	1	Required	2semester							100	1			100
Specialized Education	Machine Shop Training (b)	1	Required	3semester							100	1			



Curriculum Map of Mechanical Systems Engineering

Academic achievements Evaluation Items		1st grade		2nd grade		3rd grade		4th grade	
		Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Knowledge and Understanding	To develop the ability to work positively and independently on the development of local societies, international	Area Courses	Area Courses	Area Courses	Area Courses	Reliability Engineering	Internship		
		Health and Sports Courses	Health and Sports Courses						
		Introduction to University Education							
		Peace Science Courses							
	Acquiring necessary basic knowledge for an engineer and developing the ability to consider logically.	Exercise in Information Literacy	CalculusII	Basic Electromagnetism			Computer Programming		
		Elements of Information Literacy	Seminar in Basic Mathematics II	General Chemistry					
		CalculusI	Linear AlgebraII	Basic Engineering Computer Programming					
		Seminar in Basic Mathematics I	General Mechanics II						
		Linear AlgebraI	Experimental Methods and Laboratory Work in Physics I						
		General Mechanics I	Experimental Methods and Laboratory Work in Chemistry I						
Abilities and Skills	Acquiring basis of mechanical system engineering steadily and developing the applied skill.	Practice of Mechanical Engineering	Applied Mathematics II	Applied Mathematics III	Engineering Mathematics A	Synthesis of Applied Mathematics			
		Introduction of Mechanical and Transportation Engineering	Probability and Statistics	Engineering Mathematics C	Mechanical Materials I	Mechanical Materials II			
		Engineering Mechanics	Mechanics of Material I	Dynamics of Vibrations I	Machining	Fracture Mechanics			
		Applied Mathematics I	Fluid Dynamics I	Fluid Dynamics II	Combustion Engineering Fundamentals	Internal Combustion Engines			
		Machine Design and Drawing	Fundamentals of Materials Processing	Mechanics of Materials II	Manufacturing Systems	Computational Solid Mechanics			
			An Introduction to Engineering Materials	Mechanism and Kinematics	Reliability Engineering	Mechatronics			
			Control Engineering I	Systems Engineering	Electrical and Electronic Engineering	Machine Design			
			Thermodynamics I	Materials Science	Theory of Elasticity and Plasticity	Plastic-Working and Powder Metallurgy II			
				Heat Transfer I	Fusion and Solidification Processings I	Data Structure and Algorithm			
				Data Processing and Numerical Analysis	Dynamics of Vibrations II				
				Mathematical Optimization	Mechanical System Control				
				Control Engineering II	Machine Elements Design II				
				Instrumentation Engineering					
				Machine Elements Design I					
	Developing the ability of solving the technological issues with flexible ideas and creativity.	Introductory Seminar for First-Year Students	Machine Shop Training (a)	Machine Shop Training (b)	Systems Engineering	Experiments in Mechanical Engineering I	Experiments in Mechanical Engineering II	Graduation Thesis	Graduation Thesis
			Computer Aided Design			Mechanical Engineering Design and Production			
						Internship			
Comprehensive Abilities	Cultivating abilities of communication and of internationally collecting information and releasing it	Introductory Seminar for First-Year Students	Basic English UsageII			Experiments in Mechanical Engineering I	Experiments in Mechanical Engineering II	Graduation Thesis	Graduation Thesis
		Basic English UsageI	Communication II	Technical English			Internship		
		CommunicationI	Communication II						
		Communication I							
		Basic language I (○)							
	Basic language II								

Color-code Common subjects Foundation Courses Basic Specialized Subjects The first group Basic Specialized Subjects The second group Specialized Subjects
 Symbol Required subject Compulsory elective subject Free elective subject