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)	
(English)	Program of Mechanical Systems Engineering
1. Academic Degree to be	Acquired Bachelor's degree in Engineering

2. Overview

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-

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.

In the curriculum described above, teaching and learning will be implemented by utilizing active learning and online classes, depending on the delivery methods of the program, such as lectures and seminars.

In addition to strict grading using the standards clearly outlined in the syllabus, learning outcomes are evaluated based on the degree to which the goals set by the educational program are achieved.

- 5. Program Timing/Acceptance Conditions
- o When to start the program

The second semester of the second year

Credit Requirements

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. Acceptance conditions for the program are not particularly specified.

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.

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	Converted
achievement	values
S(Excellent: 90 points or higher)	4
A(Superior:80-89 points)	3
B(Good: 70-79 points)	2

Academic achievement	Evaluation
	criteria
Excellent	3.00 4.00
Very Good	2.00 2.99
Good	1.00 1.99

C(Fair: 60-69 points)	1
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- * For the relationship between evaluation items and evaluation criteria, see the attached Sheet 2.
- * For the relationship between evaluation items and class subjects, see the attached Sheet 3.
- * For the curriculum map, see the attached Sheet 4.
- 9. Graduation Thesis (Graduation Work) (Positioning, When and how it is assigned, etc.)
- Positioning

The graduation thesis is designed to be one component of the overall evaluation of academic achievement. It is positioned as one of the major subjects to evaluate the following:

Ability/Skills (2) Developing the ability to solve engineering issues on one's own initiative with flexible thinking and creativity

Collective capacity (1) Developing communication skills and the ability to globally collect and dispatch information.

- o When and how it is assigned
- oWhen it is assigned: At the start of the fourth year. (Only those who satisfy the conditions for embarking on a graduation thesis will be assigned a thesis.)

Conditions for embarking on a graduation thesis

- (1) Students must gain 43 credits or more out of 46 credits, the required number for graduation in Liberal Arts Education subjects.
- (2) Students must gain 10 credits or more in the first group of specialized basic subjects
- (3) Students must gain all of the required credits in Machine Design and Drawing, CAD, Machine Shop Training, Experiments in Mechanical Engineering , experiments in Mechanical Engineering , and Mechanical Engineering Design and Production.
- (4) Students must gain 11 credits or more out of 15 credits, the required number in Liberal Arts Education subjects, in the second group of specialized basic subjects.
- (5) Students must gain a total of 68 credits or more in specialized basic subjects and specialized subjects.
 - o How it is assigned

The research details of each laboratory to which the students can be assigned are explained by giving out handouts at a briefing held in February, in the second semester of the third year. After the number of students acceptable to each laboratory is given at the start of the fourth year, students who can begin their graduation theses are assigned as requested. In the case that the number of students exceeds the acceptable limit for a laboratory, adjustments may be made.

- 10. Responsibility-taking System
- (1) PDCA Responsibility-taking System ("Plan," "Do," "Check," and "Act")

The cluster leader and program leader are responsible for executing this program. Faculty committee members responsible for this program make plans, while self-check/evaluation committee members responsible for this program make evaluations. The cluster and program teachers committee scrutinize the plans and evaluations from time to time for further improvement. When major issues arise, a working group may be established at the discretion of cluster leader and program leader.

(2) Program assessment

Criteria for program assessment

Whether or not each class subject is properly allocated in light of the goals of the program, and whether course content is appropriate

Whether or not, on average, students taking the course have achieved or exceeded the goals

Whether or not the system runs in proper cycles that enable the continuous improvement of the program

How the program is assessed

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

o Position on feedback to students 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 Mechanical Systems, Transportation, Material and Energy

					Required		NI C	Type of								semester	
	S	Subj	ect ty _]	pe	No. of credits	Class subjects, etc.	No. of credits	course registrat	lst g ring		Spr	grad Fa		rd g ing		4th g Spring	rade Fall
	Doo	C		Courses	credits			ion									
		1	oductio														
	ourse versit ation			Education													
	Basic Courses in University Education			ry Seminar ear Students													
	m -=	101 1	11150-10	- Students													
		Are	a Cour	rses													
					4	Courses in Natural Sciences	2	Compuls ory elective									
				Basic English	2	Basic English UsageI	1	Required									
				Usage	٤	Basic English UsageII	1	Kequireu									
	ects	sage	Engli sh	Communica		CommunicationI	1										
	Subje	angue	(Note 2 3)	tion I	2	Communication I	1	Required									
	Common Subjects	Foreign Languages		Communica		Communication II	1										
	Com	Forei		tion II	2	Communication II	1	Required									
ects				reign Languages ne language from		1 subjects from Basic language I	1	Compuls									
Subje				French, Spanish, Chinese, Korean,	2	1 subjects from Basic language II	1	ory elective									
cation		Inform	l	Data Science Courses	2	Introduction to Information and Data Sciencies	2	Required									
Liberal Arts Education Subjects		Heal	lth and S	Sports Courses	2		1or2	Compuls ory elective									
ıl Ar		1				CalculusI	2	elective									
ibera						CalculusII	2										
Ī						Linear AlgebraI	2										
						Linear AlgebraII	2										
						Seminar in Basic Mathematics I	1										
					18	Seminar in Basic Mathematics II	1	Required									
		ъ				General Mechanics I	2										
		Bas	ic Subj	ects		General Mechanics II	2										
						Basic Electromagnetism	2										
						Experimental Methods and Laboratory Work in Physics I Note	1										
						Experimental Methods and Laboratory Work in Physics II Note	1										
						General Chemistry	2										
					2	Experimental Methods and Laboratory Work in Chemistry I Note	1	Compuls ory									
						Experimental Methods and Laboratory Work in Chemistry II Note	1	elective									
	No. of cre	dits r	equired	for graduation	46		•	•									
					1												

- Note 1 When students fail to acquire the credit during the term or semester marked with in the boxes for the year in which the course is taken, they can take the course in subsequent terms or semesters. Depending on class subject, courses may be offered in semesters or terms different from those

 Note 2 The credit obtained by mastery of "English-speaking Countries Field Research" or self-directed study of "Online Seminar in English A B" cannot be counted towards the credit necessary for graduation. The credit obtained by Overseas Language Training can be recognized as Communication or if application is made in advance. For more details, please refer to the article on English in Liberal Arts Education in the student handbook.

 Note 3 We have a recognition of credit system for foreign language proficiency tests. For more details, please refer to the article on English in Liberal Arts
- $Education\ in\ the\ student\ handbook.$
- Note 4 Students must take both Experimental Methods and Laboratory Work 1credit and Experimental Methods and Laboratory Work 1credit .

Cluster 1 Basic Specialized Subjects

Required subject Compulsory elective subject Free elective subject

			Type of cregistra					•			urs/Wee		ab _j leec		
	Class Subjects	Credits	Mechanical Systems Engineering Transportation	Materials Processing	. 0			-	Ü				4th gr	Fall	Note
			Me	Ma	1T 2T	3T	4T	1T 2	2T 3'	Т 4Т	1T 2T	3T 4T	' 1T 2T 3	8T 4T	
	Applied Mathematics I	2				4									
	Applied Mathematics II	2						4							
	Applied Mathematics III	2							4	Į					
	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						
	Mechanics of Material I	2						4							
	Thermodynamics I	2						4							
	Fluid Dynamics I	2							4						
	Control Engineering I	2							4						
1	An Introduction to Engineering Materials	2						4							
٥	Fundamentals of Materials Processing	2							4						
i	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)

Required subject Compulsory elective subject Free elective subject

1T 2T3T4T 1T 2T3T4T 1T 2T3T4T 1T 2T3T4T

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						

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

Excellent	Very Good	Good

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					Knowl	edge and	Undara			ion iten bilities		lls	Comprehen	sive Abilities	Total weighte
						eage and 1)		tanding 2)		1)		2)		1)	d
			Type of		,	1)	`	~)	<u> </u>	1			`	1)	values of
Subject type	Class subjects	credits	course registration	Period	Weighted values of	Weightsed	Weighted values of	Weightsed	Weighted values of	Weightsed	Weighted values of	Weightsed	Weighted values of	Weightsed	
					evaluation items in	values of evaluation	evaluation items in	values of evaluation		values of evaluation	evaluation items in	values of evaluation	evaluation items in	values of evaluation	ion
					the	items	the	items	the	items	the	items	the	items	items in the
					subject		subject		subject		subject		subject		subject
Liberal Arts Education	Introduction to University Education	2	Required	1semsester-1T	100	1									100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	Required	1semsester							50	1	50	1	100
Liberal Arts Education	Peace Science Courses	2	Elective	1semsester-2T	100	1									100
Liberal Arts Education	Basic English UsageI	1	Required	1semsester		_							100	1	100
Liberal Arts Education	Basic English UsageII	1	Required	2semsester									100	1	100
Liberal Arts Education		1	Required	1semsester									100		100
	CommunicationI		 											1	
Liberal Arts Education	Communication I	1	Required	1semsester									100	1	100
Liberal Arts Education	Communication II	1	Required	2semsester									100	1	100
Liberal Arts Education	Communication II	1	Required	2semsester									100	1	100
Liberal Arts Education	Basic language I	1	Elective	1semsester-1T									100	1	100
Liberal Arts Education	Basic language II	1	Elective	1semsester-2T									100	1	100
Liberal Arts Education	Area Courses Courses in Arts and Humanities/Social Sc	4	Elective	1,2,3,4semseste	100	1									100
Liberal Arts Education	Area Courses Courses in Natural Sciences	4	Elective	1,2,3,4semseste	100	1									100
Liberal Arts Education	Health and Sports Courses	2	Elective	1,2semsester	100	1									100
Liberal Arts Education	Introduction to Information and Data Sciencies	2	Required		100		100	1							1001se
Laucauon	Jan Jan Kills	~	required	13cmsester			100	1							100156
				-											
							100	1							100
Liberal Arts Education	Linear AlgebraII	2	Required	2semsester			100	1							100
Liberal Arts Education	Seminar in Basic Mathematics I	1	Required	1semsester			100	1							100
Liberal Arts Education	Seminar in Basic Mathematics II	1	Required	2semsester			100	1							100
Liberal Arts Education	General Mechanics I	2	Required				100	1							100
Liberal Arts Education		2	Required				100	1							100
	General Mechanics II		 												
Liberal Arts Education	Basic Electromagnetism	2	Required				100	1							100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I	2	Required	2semsester			100	1							100
Liberal Arts Education	General Chemistry	2	Elective	3semsester			100	1							100
Liberal Arts Education	Experimental Methods and Laboratory Work in Chemistry I	2	Elective	2semsester			100	1							100
Specialized Education	Applied Mathematics I	2	Required	2semsester					100	1					100
Specialized Education	Applied Mathematics II	2	Required	3semsester					100	1					100
Specialized Education	Applied Mathematics III	2	Required	4semsester					100	1					100
Specialized Education	Engineering Mathematics A	2	Elective	5semsester					100	1					100
Specialized Education	Engineering Mathematics C	2	Elective						100	1					100
			1	4semsester					1						
Specialized Education	Probability and Statistics	2	Required	3semsester					100	1					100
Specialized Education	Synthesis of Applied Mathematics	2	Elective	6semsester					100	1					100
Specialized Education	Practice of Mechanics	1	Elective	2semsester					100	1					100
Specialized Education	Engineering Mechanics	2	Elective	2semsester					100	1					100
Specialized Education	Introduction of Mechanical and Transportation Engineering	2	Required	2semsester					100	1					100
Specialized Education	Technical English	1	Required	3semsester					100	1					100
Specialized Education	Basic Engineering Computer Programming	2	Required				100	1							100
Specialized Education	Experiments in Mechanical Engineering I	1	Required								80	1	20	1	100
			 												
Specialized Education	Experiments in Mechanical Engineering II	1	Required	6semsester			 		100		80	1	20	1	100
Specialized Education		2	Required						100	1					100
Specialized Education	An Introduction to Engineering Materials	2	Required	3semsester					100	1					100
Specialized Education	Mechanics of Material I	2	Required	3semsester			<u></u>		100	1					100
Specialized Education	Dynamics of Vibrations I	2	Required	4semsester					100	1					100
Specialized Education	Control Engineering I	2	Required	3semsester					100	1					100
Specialized Education	Fluid Dynamics I	2	Required						100	1					100
Specialized Education	-	2	-	3semsester-1T					100	1					100
	Thermodynamics I		Required						1						
Specialized Education	Machine Design and Drawing	1	Required						100	1					100
Specialized Education	Computer Aided Design	1	Required	3semsester							100	1			100
Specialized Education	Mechanical Engineering Design and Production	1	Required	6semsester							100	1			100
Specialized Education	Computer Programming	2	Required	5semsester			100	1							100

					_ /										Total
					Knowledge and Understanding Abilities and Skills Comprehensive Al										weigh
						1)		2)		1)		2)	(1)	d
Subject type	Class subjects	credits	Type of course registration	Period	Weighted values of evaluation items in the subject	Weightsed values of evaluation items	values of evaluation items in the subject								
Specialized Education	Machine Shop Training (a)	1	Required	2semsester	•						100	1			100
Specialized Education	Machine Shop Training (b)	1	Required	3semsester							100	1			100
Specialized Education	Mechanical Materials I	2	Elective	5semsester					100	1					100
Specialized Education	Mechanical Materials II	2	Elective	6semsester					100	1					100
Specialized Education	Fracture Mechanics	2	Elective	6semsester					100	1					100
Specialized Education	Fusion and Solidification Processings I	2	Elective	5semsester					100	1					100
Specialized Education	Plastic Working and Powder Metallurgy II	2	Elective	6semsester					100	1					100
Specialized Education	Materials Science	2	Elective	4semsester					100	1					100
Specialized Education	Machining	2	Required	5semsester					100	1					100
Specialized Education	Fluid Dynamics II	2	Elective	4semsester-4T					100	1					100
pecialized Education	Heat Transfer I	2	Elective	4semsester-3T					100	1					100
pecialized Education	Combustion Engineering Fundamentals	2	Elective	5semsester					100	1					100
pecialized Education	Internal Combustion Engines	2	Elective	6semsester					100	1					100
pecialized Education	Data Processing and Numerical Analysis	2	Elective	4semsester					100	1					100
pecialized Education	Theory of Elasticity and Plasticity	2	Elective	5semsester					100	1					100
pecialized Education	Computational Solid Mechanics	2	Elective	6semsester					100	1					10
pecialized Education	Mathematical Optimization	2	Elective	4semsester					100	1					10
pecialized Education	Mechanics of Materials II	2	Elective	4semsester					100	1					10
pecialized Education	Mechanism and Kinematics	2	Elective	4semsester					100	1					10
pecialized Education	Dynamics of Vibrations II	2	Elective	5semsester					100	1					10
pecialized Education	Control Engineering II	2	Elective	4semsester					100	1					10
Specialized Education	Electrical and Electronic Engineering	2	Elective	5semsester					100	1					10
Specialized Education	Mechatronics	2	Elective	6semsester					100	1					10
pecialized Education	Measurement and Signal Processing	2	Required	4semsester					100	1					10
Specialized Education	Mechanical System Control	2	Elective	5semsester					100	1					10
specialized Education	Data Structure and Algorithm	2	Elective	6semsester					100	1					10
Specialized Education	Manufacturing Systems	2	Required	5semsester					100	1					10
pecialized Education	Machine Elements Design I	2	Elective	5semsester					100	1					100
Specialized Education	Machine Elements Design II	2	Elective	6semsester					100	1					10
Specialized Education															

Curriculum Map of Mechanical Systems Engineering

Sh	ρ,	1
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	Academic achievements	1st s	grade	2nd	grade	3rd	grade	4th	grade
	Evaluation Items	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
ıdi	To develop the ability to	Area Courses	Area Courses	Area Courses	Area Courses	Reliability Engineering	Internship		
tar	work positively and	Health and Sports Courses	Health and Sports Courses				•		
ers	independently on the	Introduction to University Education							
Und	To develop the ability to work positively and independently on the development of local societies, international	Peace Science Courses							
pu		Introduction to Information and Data Sciencies	CalculusII	Basic Electromagnetism					
a	Acquiring necessary basic	CalculusI	Seminar in Basic Mathematics II	General Chemistry					
dğ	knowledge for an engineer	Seminar in Basic Mathematics I	Linear AlgebraII	Basic Engineering Computer Programming					
vle	and developing the ability	Linear AlgebraI	General Mechanics II						
Knowledge and	to consider logically.	General Mechanics I	Experimental Methods and Laboratory Work in Physics I						
\overline{X}			Experimental Methods and Laboratory Work in Chemistry I						
			Practice of Mechani	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		
S	Acquring basis of			An Introduction to Engineering Materials	Mechanism and Kinematics	Reliability Engineering	Mechatronics		
Ιij	mechanical system			Control Engineering I	Systems Engineering	Electrical and Electronic Engineering	Machine Design		
S	Acquring basis of mechanical system engineering steadily and			Thermodynamics I	Materials Science	Theory of Elasticity and Plasticity	Plastic Working and Powder Metallurgy II		
and	developing the applied skill.				Heat Transfer I	Fusion and Solidification Processings I	Data Structure and Algorithm		
					Data Processing and Numerical Analysis	Dynamics of Vibrations II			
Abilitis					Mathematical Optimization	Mechanical System Control			
₽pi					Control Engineering II	Machine Elements Design II			
1					Measurement and Signal Processing	Computer Programming			
					Machine Elements Design I				
	Developing the ability of	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
	solving the technological			Computer Aided Design			Mechanical Engineering Design and Production		
	issues with flexible ideas						Internship		
	and creativity.								
e.		Introductory Seminar for First-Year Students	Basic English UsageII			Experiments in Mechanical Engineering I	Experiments in Mechanical Engineering II	Graduation Thesis	Graduation Thesis
	Cultivating abilities of	Basic English UsageI	Communication II	Technical English			Internship		
	communication and of	CommunicationI	Communication II						
mpr	internationally collecting	Communication I							
Coi	information and releasing it								
		Basic language II							

Color-code Common subjects
Symbol Required subject
Compulsory elective subject
Foundation Courses
Symbol Required subject
Symb